COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

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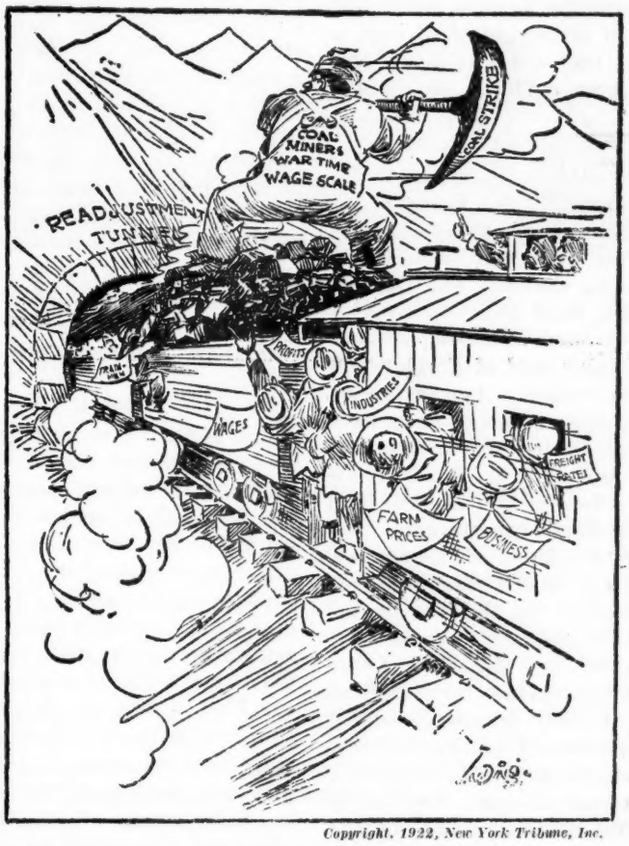
Senator Kenyon's Industrial Peace Plan

WHAT happens when an irresistible force meets an immovable body? Senator Kenyon in his report on the Mingo situation compares the desire of the United Mine Workers to organize the West Virginia fields and the opposition of the operators to such organization in the terms of the age-old quiz in high school physics. The scientist has never furnished an answer but Senator Kenyon has proposed one. It is a governmental body without judicial, executive or police power, able only to enlist public opinion. To such a body he would have the miners' union tell their story, presumably much as they told it to the Senator, and here also the operators would tell their story. And the public would settle it by deciding which is right.

The report is an able document. The case is fairly stated, the claims of both miners and operators are carefully set forth, the issue is defined with no dodging of the points in dispute, and the author courageously proposes a solution. He sets forth his views of industrial relations at length, backed up with a historical review that is concise and comprehensive, and concludes with an expression of hope that the Senators will study his document in preparation for consideration of a bill that he will later introduce on the subject.



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LOOKS LIKE A BAD TIME TO INSIST ON STANDING OUT ON TOP

We urge everyone to read the somewhat lengthy report of twenty-six printed pages (abstracted in this issue of *Coal Age*) for the light that it sheds on the author's ideas and beliefs on industrial relations. Neither side to the conflict in West Virginia will obtain the satisfaction from the report they might have desired, for he is unsparing in his condemnation of certain practices of each and equally considerate in recognizing the moral and legal rights of both.

On the whole we believe that the operators have the better of it. Their right to refuse employment to union miners because they would become agitators is not contested, but, on the other hand, the right of the union to attempt organization by peaceful means is recognized and stressed. It seems that the principal encroachment of rights by the operators has been in subsidizing deputy sheriffs who act as other than strict guardians of their private property. In other words, the operators are found to have stretched several points in their efforts to keep the union out of the field. He points to Logan County in particular in this regard.

On two main points the union is severely criticized. The Senator considers it "rather unfortunate" that the United Mine Workers changed their constitution to read that they demand "full social value of their product" instead of, as originally stated, "an equitable share of the value of their product." He says it cannot be disputed that the United Mine Workers have "done acts of violence in this Mingo controversy." The Senator says, however, that he is more concerned with remedies than with a review of past conditions and seeks some means of reconciling what he recognizes as diametrically opposing interests and at the same time giving recognition to the great third party at interest, the public.

Senator Kenyon frankly states his lack of faith in the Kansas Industrial Court because "it has no underlying code of rules or principles which are regulatory or mandatory upon the court." He thinks that this court is "based upon a violation of previous experience, both here and abroad, arising from legislation prohibiting strikes, and, further, it aims to solve a problem in human adjustments with an arbitrary, rigid and unrestricted judicial fiat." The tribunal he proposes differs in his opinion because having as a base a code of principles sanctioned by industrial usage and, he trusts, to be sanctioned by the Congress. He ventures the hope that, lacking the fundamental defects of the Kansas court, his plan would meet with "complete success and approval."

He proposes a replica of the present Railway Labor Board, three members representing labor, three the operators and three the public, all to be appointed by the President, the findings of the board to be published, and enforced by public opinion, no fines or penalties to

be provided. In this proposal Senator Kenyon displays no originality. If he will turn to pages 34-38 of Dr. Garfield's personal report* to President Wilson on his direction of the Fuel Administration, he will find the same plan proposed; proposed too, we feel, out of wider experience and with more sympathy for all concerned and with no possible taint of political expediency.

There is perhaps one major point of difference between the Kenyon and the Garfield plans, although, until the Senator has told us more, of this we cannot be sure. Dr. Garfield would have a commission "to forestall controversies, to consider at any and all times conditions likely to disturb industrial relations, and in no sense to be regarded as a court or board of arbitration for the settlement of disputes."

We cannot but feel that problems of industrial relations are no more impossible of solution than the Irish question, but, like that famous controversy, now happily on the way to settlement, the road to peace is long and tiresome. We commend the Kenyon report for not taking the popular form of state control of coal, a direction which he might have been expected to go and for which there is already some evidence of popular demand.

A Phrase Turned Into Cash

"MORE business in government" was a happy presidential phrase. Its utterance awakened hopes and elicited some cheers. Then American business sat back critically and waited to be shown. The Department of Commerce has worked hard to meet expectations. In a year the business bureaus of the department —Bureaus of Standards, of Census, and of Foreign and Domestic Commerce—have answered a heterogeneous mass of 300,000 inquiries from business. They have made active contact with 127 trade associations and with 90 business committees representing 350,000 engineers, merchants and manufacturers who needed—and have been getting—the department's assistance.

Take the Bureau of Foreign and Domestic Commerce. Today committees representing 60,000 business men are steadily collecting information for the bureau and getting definite aid worth much cold cash. An automotive division has organized a company under the Webb-Pomerene Act to open the foreign market for American machines. The foodstuffs division is now studying Europe to develop vast new markets for corn products. The lumber division has prepared a lumber exporters' directory and a uniform contract of sale. The textile division has salvaged $6,000,000 worth of goods in Cuba.

The service of the whole Department of Commerce must grow. It is far too valuable to be limited. That accomplished acid-test operator, Budget Director Dawes, grants this. He has approved the department's request for $20,000,000 for 1922—an increase of $750,000 to extend the service and partially equalize salaries so that the department can fairly compete with business in paying for brains when it gets them. The appropriation will soon come before Congress. That governing body should be left in no doubt as to America's appreciation of this new injection of "more business in government."

The coal industry can selfishly support this work which makes for more and wider markets for coal, both directly and indirectly. That the department has not rejuvenated the export trade in coal is due to no lack of constructive effort. Congress should be told that the coal industry is back of the kind of work the new Department of Commerce is doing and can do for its benefit.

*Final report of the U. S. Fuel Administration: Report of the Administrative Division, Part 11; Government Printing Office.

Leap Year for the Coal Miners

WHEN, in 1906, operators in some union fields, particularly Illinois, reversed the usual order and formulated "demands" upon the miners, the occasion was made much of, although the demands were concerned with certain working conditions rather than wages. Until now not since 1906 has the procedure of collective bargaining varied from the usual formulation and presentation of "demands" from the miners' union. In fact, demanding more wages and changes in working conditions provocative of higher mining costs has become a habit with the union. What other excuse could there be for having a convention? Of what use is the union if it fails to elevate wages and earnings? The United Mine Workers has been erected on a program of steady advances. It has never been called upon to meet a substantial reduction or been forced to retreat. Beaten in the field in 1919, it won the strike in Washington. A 27-per cent advance in wages was no small consideration for a six weeks' strike.

The operators' organization in the Central Competitive Field is plainly enough a defensive machine, as distinguished from the aggressive miners' union. Banding together, the operators in western Pennsylvania, Ohio, Indiana and Illinois have for 30 years or more had one major objective, namely, holding the advances on each new contract uniform as between producing districts.

The tide of battle has turned. Through no circumstance of their own making the miners are on the defensive. Casualties already are heavy. Washington, on the western outpost, succumbed last summer; recently the New River field and numerous small locals have surrendered. Now it is a wise general who can recognize the necessity for a retreat and who knows how to conduct such a maneuver without destroying morale and disrupting organization. The British and French armies in March, 1918, began a retreat that progressed until they held but a toehold on the seashore of northern France, but the generals preserved their organizations, ready for a new advance.

Going back again to 1906 we find that not only was precedent broken by "demands" from the operators but, most important of all, the interstate agreement was abolished. In other words, the producers effected individual settlements with mine labor. They assumed the offensive; they turned on their aggressors, the miners' union.

So, when last week the Pittsburgh coal operators and 48 hours later the southern Ohio producers, announced the wages and working conditions that will obtain in their mines after March 31 they did not break all precedent. History is repeating itself. When it is on the aggressive the Central Competitive Field acts not as a unit but each group takes the initiative.

It is, of course, absurd to expect the miners to assemble and "demand" reduced wages. Since union wages must come down there is no point in delaying their announcement, an announcement that can come only from the employers. It is up to the operators this year. Pittsburgh and southern Ohio have taken the first move.

New Retorts Have Toggle Plates to Release Carbonized Coal and Cooling Chamber in Which to Harden It

Time of Coking, Eight Hours—Each Retort Holds Half a Ton in Two Three-Inch Layers—Coal Dried Before Charging—Rich Gas Obtained and Seven Times Benzol from High Temperature Process

By C. E. Hopkins
London, England

For more than twenty years scientists and engineers have attempted to carbonize coal at low temperature. During this time in Great Britain alone vast sums have been spent in experimental work and more than 200,000 tons of coal gathered from the four corners of the earth have been treated. No less than forty-two different types of retorts have been built, tested and found wanting. A commercially successful solution of the problem, therefore, marks a definite advance in the industry of fuel production.

The first known attempt to carbonize coal was made by William Murdock in 1792. The experiments then performed laid the foundations for the present gas industry. The inventor of the process now used was the late Thomas Parker, of Wolverhampton, who in conjunction with others in 1906 formed a private company (Coalite, Ltd.). The original plant, located at Wednesfield, was enlarged and additional plants erected at Barking, Hythe and Plymouth.

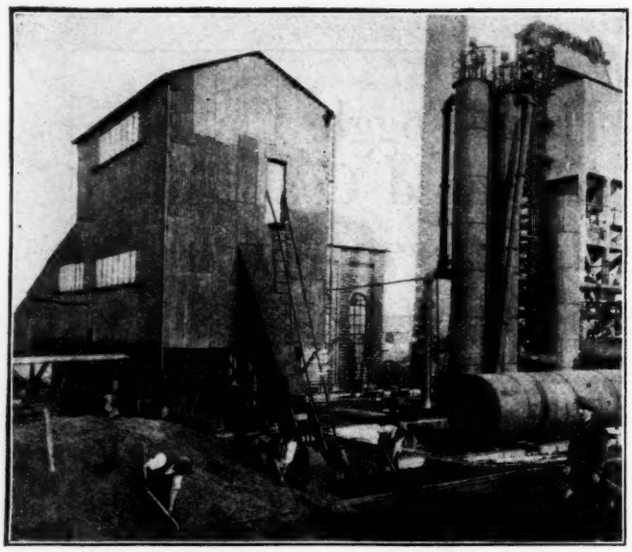
In 1911 this process attracted the attention of the Germans, who endeavored to purchase it. After lengthy negotiations it was agreed that upon payment of a substantial sum the Germans should have the right to observe the process for one year. They were so well satisfied with the results obtained that they designed, built and tried out several much improved fireclay retorts, raised capital to continue experimental work in England and organized a staff of German chemists. The war, however, put an effectual stop to their plans.

In 1914 the Barnsley Smokeless Fuel Co., Ltd., was formed to operate an experimental plant, on the site of which the present installation at Barugh was built. The erection of the new plant was seriously hampered by the war, but by 1917 it was partly completed. In this latter year was formed the firm known as Low Temperature Carbonisation, Ltd. The plant was finally completed in November of 1920 and since December of that year, with the exception of the period covered by the coal strike, it has been in continuous and successful operation.

During the long experimental period many difficulties arose. One of these was in determining which was the most advantageous material to employ in building retorts. Although cast iron was at first favored, it is now generally recognized that firebrick is the better. Though cast iron possesses many advantages, such as good heat conductivity, non-permeability by the gases evolved and ease of construction, it corrodes readily and soon begins to warp. It was finally decided, therefore, that firebrick retorts were more advantageous, although the brick is not as good a conductor of heat and the gases pass through it more readily.

Another difficulty which took much time to solve was that of extracting the "Coalite" from the retort. When coal is carbonized at low temperature, it becomes viscous and swells, clogging the retort, so that it cannot be easily extracted. With high-temperature carbonization a large portion of the volatile matter is decomposed, and the final volume of the residue is no greater than

Note—The frontispiece shows a general view of the low-temperature carbonizing works at Barugh, near Barnsley, south Yorkshire.

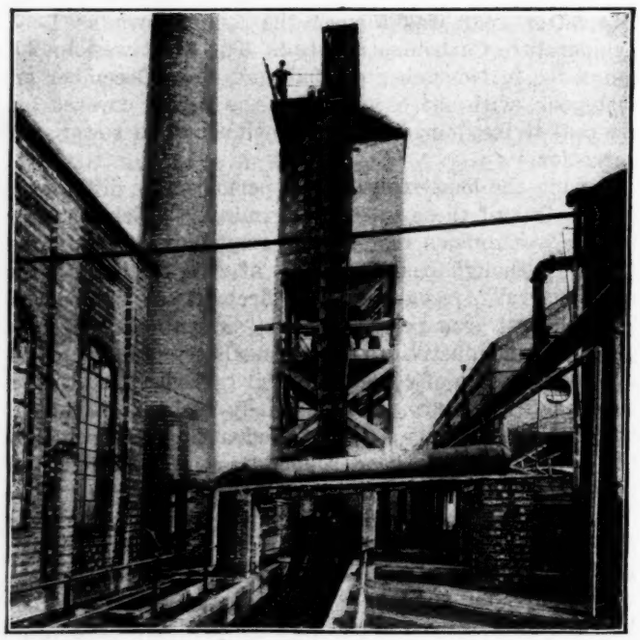


WASHERY FOR CLEANING RAW COAL OF ASH

The process of distillation removes the volatile matter from coal without taking out any of the ash. Thus the ash in anthracite, partly distilled coal and coke is in a sense concentrated. To get a high-grade article the coal should be clean before it is treated or, like the Lykens Valley anthracite, be derived from extremely pure bituminous coal.

that of the original coal charge. The difficulty of extracting the contents of the carbonizing chambers was finally solved by making the retorts vertical and inserting two cast manganese-iron plates, which are separated from each other while the coal is being carbonized. After the carbonization process is complete, these plates are brought together so that the mass of Coalite falls by gravity from the retort into the cooling chamber below.

Still another difficulty which had to be surmounted was the fact that red-hot Coalite easily ignites upon exposure to the air. If quenched with water, on the other hand, it disintegrates to dust. Coke, of course, does not behave in this manner because it contains practically no volatile matter. This problem was finally solved by the aid of a water-jacketed cooling chamber

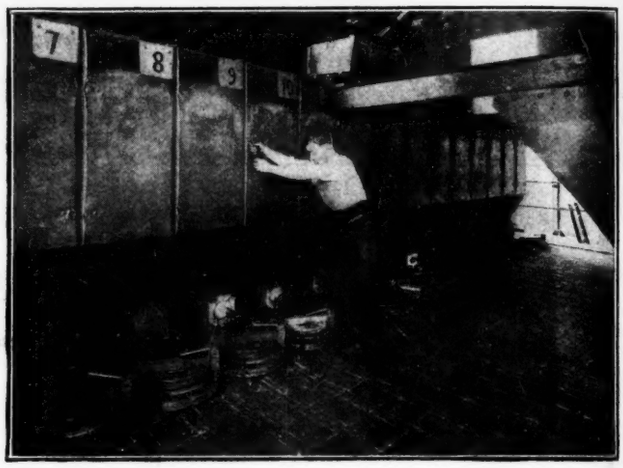


CONVEYORS CARRYING WASHED SLACK TO BUNKERS

The coal is conveyed by small wheeled cars from the storage bin to the filling hoppers above the retorts.

beneath the retort, into which the hot Coalite is dropped and where it remains while the next charge is being treated. When finally removed from the cooling chamber, the Coalite is practically cold, being at a temperature of only about 100 deg. F. Because of this method of treatment, Coalite stands transportation better than does coal itself and does not form any appreciable quantity of breeze.

As previously mentioned, the walls of firebrick retorts are slightly permeable to gas, and this introduced another difficulty. It was found that the gas evolved during carbonization penetrated the walls of the retort, where, with the gas employed in heating, it burned on the outside. This rendered it difficult if not impossible to regulate the temperature with exactitude. This difficulty was overcome by perforating the cast manganese-iron plates within the retorts and drawing off the gases through the central passage between them by suction. This device not only prevented the gases from passing through the walls of the retort but rendered it unnecessary for the gaseous products



HOPPERS FOR STORING COAL ABOVE RETORTS

These hoppers hold a half a long ton, and the coal in them, being above the retorts and being retained there for eight hours before charging, is warmed and dried. In consequence when it falls into the retorts they do not receive so severe and sudden a cooling as if the coal were wet; furthermore, distillation is more rapid and takes less heat.

to pass upward through several feet of hot coal during the carbonizing process with resultant excessive decomposition.

The plant erected at Barugh consists of a unit of twenty retorts with a total capacity of 30 tons of coal per 24-hr. day. It is, therefore, well beyond the experimental stage. The material carbonized is a mixture of coking and non-coking slack, and it is considered a remarkable achievement that these two may be mixed with satisfactory results in the proportion of 70 per cent non-coking and 30 per cent coking coal.

One-third of the total coal mined in Great Britain is slack and of this by far the greater portion is a drug on the market. Indeed in many cases this material is left within the mine unless it is necessary to remove it in order to clear the various passages.

Upon arrival at the plant, the slack is washed to free it from slate and dirt, thus insuring that the Coalite will have a low ash content. After washing, the coal is conveyed to a storage tank, from which it is transported in small cars to the filling hoppers above the retorts. These hoppers will hold exactly one charge of coal (1,120 lb.). Here the coal remains for eight hours or

during the time in which a charge below is being carbonized. Much of the moisture retained by the coal is thus driven off while the coal itself is warmed up to such a temperature that, when the incoming charge comes in sudden contact with the heated walls, the retorts are not damaged.

When the charge within the retort has been carbonized, a lever is pulled which brings the interior cast-iron plates together. The revolving door below the retort is then opened and the Coalite drops into the cooling chamber below. Another lever opens a heavy rotary gas-tight cast-iron valve at the bottom of the filling hopper

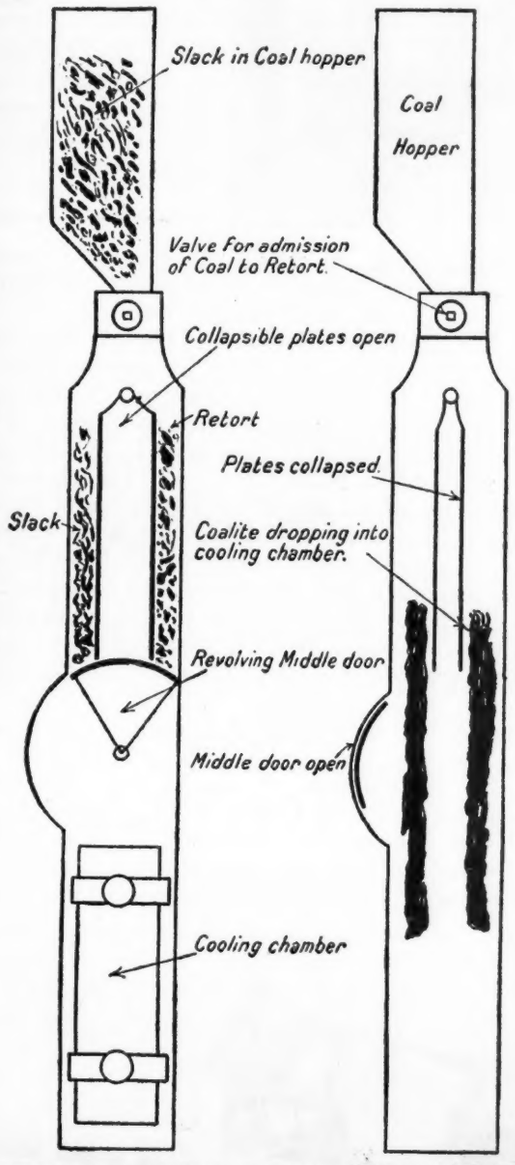
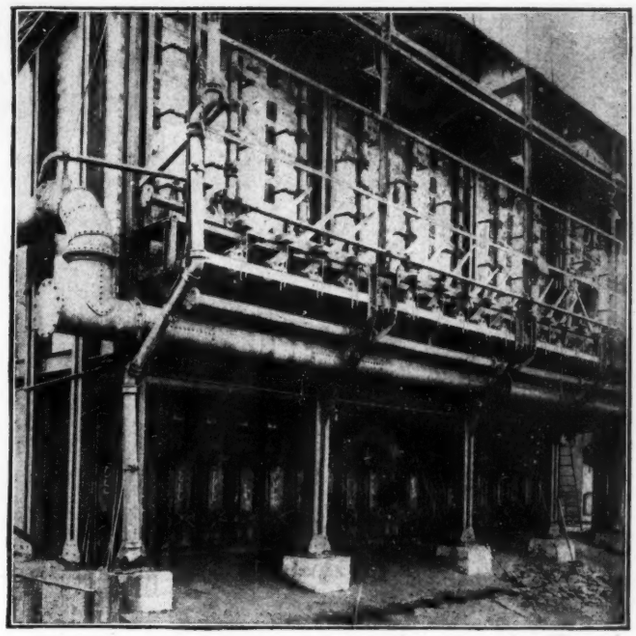


DIAGRAM SHOWING CARBONIZING PROCESS

The hairpin plates in the retort crowd the raw coal into two 3-in. layers against the hot walls, but when the plates are caused to approach and the middle door is opened the coal falls freely into the water-jacketed cooling chamber below.

and the new charge of warm coal falls into the retort. This operation takes place three times during each 24 hours, so that each retort treats 1½ long tons or 3,360 lb. of coal daily and produces 21 long hundredweights (2,352 lb.) of Coalite.

The patent retorts installed at Barugh are of standard size, being 9 ft. high, 6 ft. 6 in. long and 11 in. wide, inside dimensions. They are built of special fire-

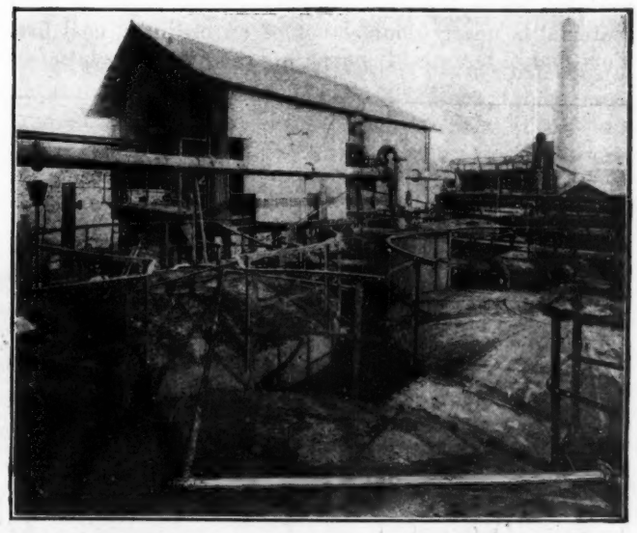


BATTERY OF TWENTY RETORTS AND COOLING CHAMBERS

By pulling the levers just above the large gas main the retorts are made to discharge their contents into the cooling chambers.

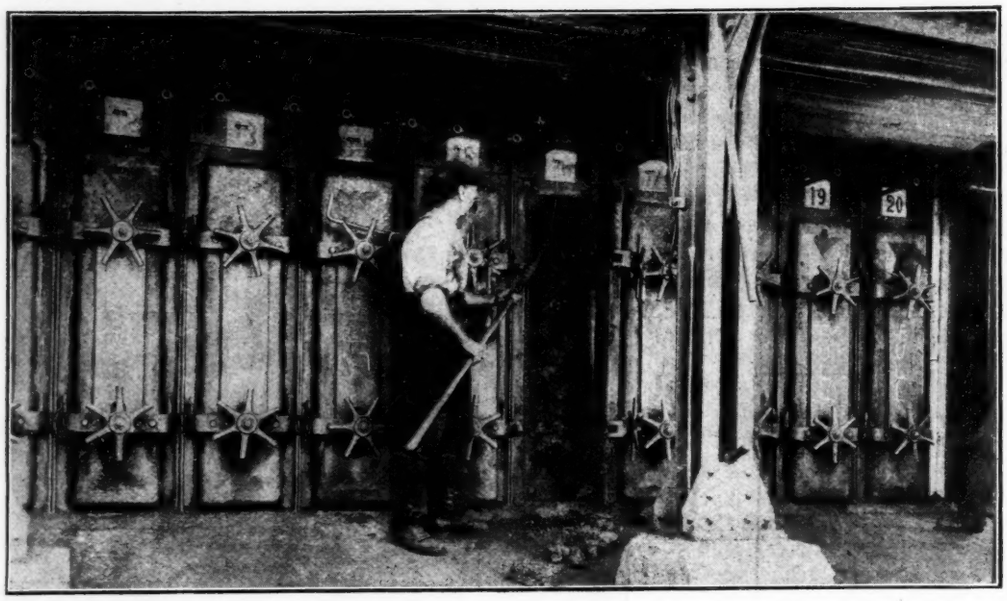
brick, laid in fireclay cement. Each retort is self-contained, the narrow passage separating adjacent retorts containing the burners. Inside of each retort the cast manganese-iron plates above referred to are suspended from a ridgepole, the distance between them being 4½ in. Thus as the coal enters the retort it is divided into two layers, each about 3 in. thick and separated from the other by the two plates. The coal, being contained in a thin layer, is thus carbonized evenly in spite of the poor heat conductivity of the surrounding walls. The resulting Coalite is thus a uniform, crisp, homogeneous mass.

Gas burners heat the retorts as in coke-oven practice. At the present time the gas thus employed is the rich product of the retorts themselves. There is little question, however, that this method is wasteful, and it will



STORAGE TANKS FOR BYPRODUCTS OF PROCESS

Ten tons of tar oils are being fractionated at the high-temperature tar distillery. Until the experiments are complete the true possibilities of the byproducts cannot be determined. Only by elaborate tests have the value and best treatment of byproducts from coke ovens been ascertained and the pitches and oils from these ovens must be put through a similar investigation.



Removing Coalite

The product was formerly removed at distillation heat and quenched with water, which caused it to break up into fines. As it was still hot it used to flame quite frequently and burn up. Now it is cooled in an airtight chamber without coming in direct contact with water. The cooling is slow and complete, and the product is consequently quite coarse and unlikely to catch fire.

eventually be found more economical to use a Mond producer plant. The gas burners are arranged in horizontal rows between the retorts, and the flames pass downward through a series of flues until they reach the bottom of the chamber, the temperature being maintained meanwhile by means of auxiliary burners. Peepholes through the brickwork are provided beside the burners and the temperature outside is maintained at about 1,200 deg. F., which corresponds to a temperature of about 1,000 deg. F. inside the retorts. The heating efficiency of this system is high, probably 15 per cent higher than that of the ordinary coke oven and far above that of the average gas works.

Coalite, or the fuel produced by this low-temperature carbonization process, is of a novel character, being unlike either coke or coal in appearance, yet combining the good qualities of both. It is a smokeless fuel, yet is easy to ignite and keep burning, is light and clean to handle and gives off none of the sulphur fumes which render a coke fire objectionable. Weight for weight, Coalite is twice as bulky as coal and lasts almost twice as long, while the radiant efficiency of a fire of this material is nearly double that of an ordinary coal fire. For many household purposes Coalite will satisfactorily replace coal. As it is a fuel of slow combustion it is particularly suitable for house-heating furnaces or for consumption in anthracite stoves.

The full industrial value of coal has not been determined but it seems obvious from the nature of the fuel that it could be used most effectively in pulverized form. It is common knowledge that powdered coal falls far short of what has been expected of it. This is partly on account of the formation of ash and clinker and partly because of the difficulties experienced in reducing the coal to the proper size. Raw coal being somewhat greasy, the fine particles to which it is reduced in crushing slip upon each other and are difficult to powder. On the other hand, Coalite, being a hard, close-grained, non-greasy substance, powders easily and does not demand the erection of an elaborate and costly pulverizing plant.

Experiments on pulverized Coalite are now being made, and the results thus far achieved have been eminently satisfactory. It has already been demonstrated that powdered Coalite is far superior to powdered coal. Burned in suspension, Coalite forms no clinkers and but little ash, most of which is blown away by the draft. It generates an intense white heat and

Retort House

Note the several hundred tons of coalite in the foreground being shoveled into coal cars. It will be interesting to note that these gondolas are provided with side doors to facilitate the loading and especially the unloading of material placed in them. The small cars make the buying of a carload lot an easy financial transaction.

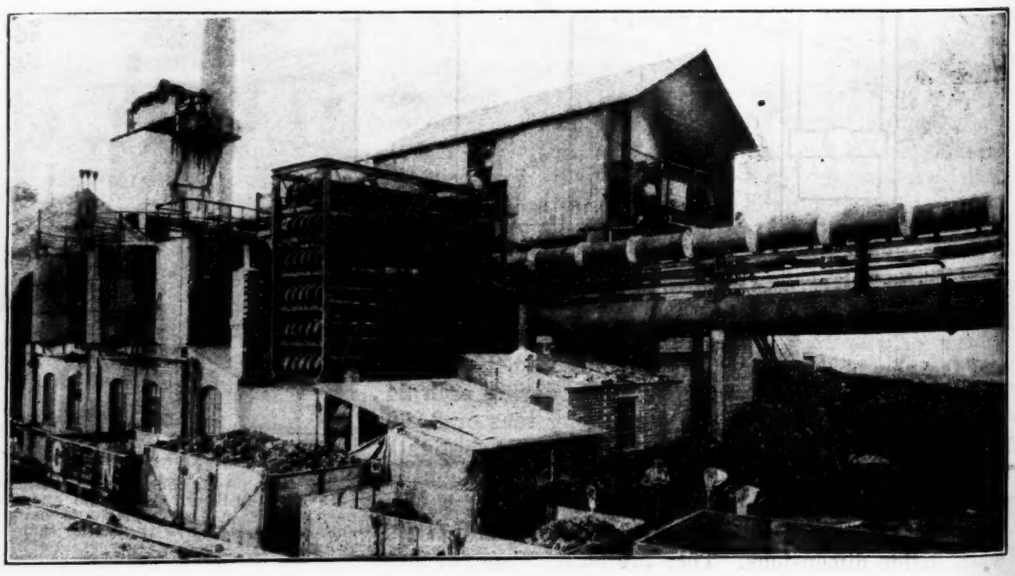


TABLE I. YIELD OF BYPRODUCTS FROM 1 LONG TON OF AVERAGE COAL, CONTAINING 25 TO 30 PER CENT OF VOLATILE MATTER

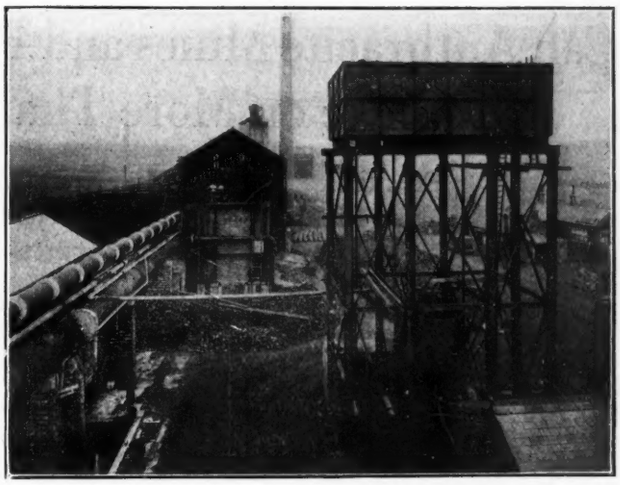
	Low-Temperature Carbonization	High-Temperature Gas Works	Carbonization Coke Ovens
Temperature of Carbonization.....	About 1,000° F.	About 1,800° F.	About 1,800° F.
Gas.....	5,000 to 6,000 cu.ft. (700 to 750 B.t.u.)	12,000 cu.ft. of medium quality coke-town gas (550 B.t.u.)	11,500 cu.ft. of poor quality oven gas (450 B.t.u.)
Liquid Products.....	18 to 20 gal. of tar oil (fractionated to 3½ gal. of motor spirit, 8 to 9 gal. of fuel or Diesel oil, the rest being lubricating oil.)	10 gal. of coal tar. Fractionated to about ½ gal. motor spirit, some fuel oil, a large quantity of naphthalene, etc.	8 gal. of coal tar.
Sulphate of Ammonia	15 lb.	25 lb.	28 lb.
Residue in Retort...	1,568 lb. smokeless fuel Coalite (9 to 10 per cent volatile matter.)	1,512 lb. of soft coke (about 1 per cent volatile matter.)	1,565 to 1,624 lb. of hard metallurgical coke (less than ½ per cent volatile matter.)

is non-explosive. It is the opinion of some responsible engineers that in many cases the use of powdered Coalite will increase the efficiency of existing equipment as much as 30 per cent. Little doubt is entertained that the use of pulverized Coalite can be extended to steamship propulsion and to locomotives with increased efficiency in each case.

In the past it has sometimes been questioned whether low-temperature carbonization would pay financially. The high-temperature carbonization process always has been a paying proposition and the cost of erecting and operating a plant working at low temperature is said to be no greater than is that of one employing high temperature. Furthermore, the byproducts derived from the low-temperature process greatly exceed in value those obtained from the high-temperature process. This may be seen from Table I.

Granting that the cost of operating Coalite retorts is the same as that of handling byproduct coke ovens, it would seem from the table that low-temperature carbonization should offer not only financial possibilities but even larger profits than are derived from carbonization at high temperatures. It has been estimated by Sir Percy Girouard, the engineer and director of the Armstrong-Whitworth establishment, after carrying out an independent investigation into the possibilities of this process, that the possible profit obtainable by carbonizing one long ton of coal slack is 17s. 11d. ($4.35 at normal exchange). It is believed that this estimate is conservative.

In it no account was taken of the richness of the gas produced in this process, and the benzol production was assumed to be only one gallon per ton, whereas the normal yield is well above three gallons. Tests are now being made upon the tar oil yielded, and it is expected



BIRDSEYE VIEW OF THE BARUGH PLANT

Looking toward the end of the retort house. For an experimental plant the construction is unusually substantial from an American viewpoint.

that discoveries will soon make it possible to increase appreciably the value of this derivative.

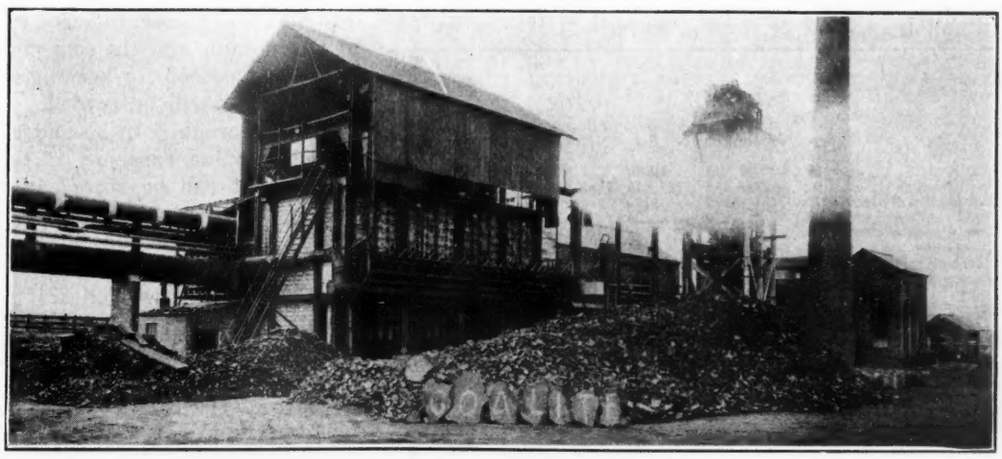
One of the most interesting aspects of low-temperature carbonization, and from the British point of view, decidedly the most important consideration, is its bearing on the oil problem. At present Great Britain is entirely dependent on foreign countries for its oil supply. Furthermore, the oil output of the world is failing, the total world's production now being only about 600,000,000 barrels, equivalent in heating value to 150,000,000 tons of coal. Thus the entire oil production of the world is not equal in available heat content to the coal actually used in Great Britain alone, and is only equivalent to 8 per cent of the world's coal output.

By carbonizing at low temperature the 140,000,000 tons of coal now used every year in its raw state in Great Britain more than 400,000,000 gallons of motor spirit could be produced annually without interfering with existing processes. This is nearly twice the present consumption of the whole country. In addition to this motor spirit the carbonization of 140,000,000 tons of coal would yield about 1,250,000,000 gallons of Diesel and lubricating oils.

One of the leading engineers of Great Britain has expressed the opinion that the perfection of the low-temperature carbonization process is the most important industrial event since the invention of the steam engine and some believe that the universal adoption of low-temperature carbonization will herald a new industrial era.

Retort House

The product stores well and does not suffer in transportation. Only about 5 per cent of the Coalite is breeze, yet in its manufacture 70 per cent of non-caking slack is used.



Can Anthracite Mines and Preparators Be Operated with Advantage on More Than One Shift Per Day?—II*

Economies in Cost of Large Preparators So Great That Small Three-Shift Plants Would Fail to Yield Savings Expected — Summary of Advantages and Disadvantages Shows Latter Outnumber Former

BY DEVER C. ASHMEAD†
Kingston, Pa.

UNFORTUNATELY few figures are available to show how a change from single- to triple-shift operation would affect the cost of development. In Table I data from which this effect may be judged have been brought together.

If, Case I, the preparator were operated upon three capacity shifts, or, in other words, the output was trebled, then full advantage of the equipment investment would be taken, but the investment in the preparator would need to be increased to provide more machinery to take care of breakdowns and permit continuous operation.

If, Case II, the total output is to remain the same and the present preparator is to run on three shifts, then no advantage will be obtained, as the investment remains the same, provided no new preparator is constructed. Although operated continuously, only one-third of the capacity of the equipment is being used in each shift and therefore there is practically no greater use of the investment in three-shift than in one-shift operation.

It remains for us to inquire (Case III): What would be the effect of building preparator one-third the size were the larger building burned down? Could such a plant be operated to advantage on a triple shift so as to make its output equal to that of the preparator it replaced? Looking at the table it will be seen that the preparators of mines Nos. 1 and 3 each have approximately one-third the capacity of the preparator at mine No. 5, all three being modern steel buildings of the same general type. The average cost of the smaller buildings is $200 per ton capacity, whereas the cost of the larger building is $180. In the instance cited it will be seen that the investment on a small building is a little greater than for a large one, but when worked with triple shifts the smaller plant is by far the less expensive.

Taking mine No. 2, which has approximately one-third the capacity of mine No. 4, it is found that the cost of the preparator per ton capacity of the smaller operation is $205, as against $103 for the larger. This latter relation is more typical of the average condition in the anthracite field than is that made in the preceding paragraph, as in that instance the preparator for mine No. 6 cost more than is usual owing to certain conditions peculiar to its construction. Therefore a preparator one-third the size of another will cost approximately 100 per cent more per ton of output.

With triple shifting a larger quantity of supplies must be carried in stock as a reserve to be used in case of breakdowns, as it would not be possible to repair the equipment, for it could be continually running. Furthermore, as it could not be maintained in as good condition, it would have to be the sooner replaced.

A saving would be effected by triple shifting, because the demand for power would be steady and stand-by losses would be avoided. All the power, no matter when produced, would directly promote the production of coal.

TABLE I. COST OF CONSTRUCTION AND OTHER PREPARATOR OPERATING DATA AS OF 1920

	Mine No. 1	Mine No. 2	Mine No. 3	Mine No. 4	Mine No. 5
Maximum capacity, tons daily	1,800	1,500	1,800	4,800	6,000
Cost of construction	$358,835	$307,865	$360,346	$495,976	$1,078,000
Cost per ton of capacity	$199	$205	$202	$103	$180
Total number of employees	39	26	39	59	56
Tons prepared per day per employee	46	54	46	81	107
Tons coal prepared in 1920	299,883	222,792	326,569	515,169	997,563
Average tons prepared per day	1,082	883	1,320	1,812	3,420
Per cent of maximum capacity	60	59	73	38	57

*Article entitled "Can Anthracite Coal Mines Be Operated Profitably on More Than One Shift?" to be presented before the February meeting of the American Institute of Mining and Metallurgical Engineers in New York City.

†Anthracite editor, *Coal Age*.

THE VEXED QUESTION: HOW TO STORE OUTPUT?

If the mine is planned to operate on three shifts and the preparator on one shift, then the coal mined while the preparator is idle must be stored. There are two places for the storage of this coal—on the surface and underground—and there are three methods that can be used in one place and two in the other.

For surface storage, pockets must be provided or the coal be dumped in piles on the ground or retained in the mine cars. It will be necessary to construct storage pockets of such capacity that they will hold the output from two shifts and to design them so that degradation will be small and the coal can be loaded out of them economically. If the coal were to be stored in stockpiles a suitable method would have to be provided to handle the coal from the mine cars to the stockpiles and from the piles to the preparator. This system must be so designed that the degradation of the coal will be reduced to a minimum, and the coal must be recovered cheaply. Also some method for keeping the coal from freezing in cold weather will be needed.

If the storage is to be underground, the coal may be stored in mine cars, or, if the measures are steeply pitching, it can be stored in the breasts themselves. If the first method is chosen, enough cars should be provided to handle the output for a period of twenty-four hours; at least, the number of cars should suffice to hold the coal two full shifts and to handle the coal during the shift that is being worked while the preparator is running. Although it has been said that this storage is to be underground, in warm weather all or part of the cars could be held on a siding on the surface and in cold weather a thaw shed could be used.

If the cars are to be left underground, then ample additional siding space must be provided, and this is extremely expensive, especially underground, where sidings usually involve excavation and timbering.

If the measures in general pitch steeply, the coal can be stored in the breasts during two of the shifts and drawn out only while the preparator is operating. This would mean that a somewhat smaller number of mine cars would be needed. Underground haulage force would be lessened in this case, as no coal would be hauled during two of the shifts except in those portions of the mine where the measures are so level that the coal will not run out of the breasts. Fewer men also would be required for hoisting, as this operation would go on during only one shift. This would reduce the number of headmen and footmen, but would not entirely eliminate them during the two shifts during which no coal was being hoisted, as supplies would be handled and men raised and lowered.

Mine Car Storage Alone Obviates Breakage

Of the two methods of surface storage that in mine cars is the better, as in this case the coal has to be handled only once and therefore there is no degradation. If stored in piles on the surface second handling of the coal cannot be avoided and the coal is broken and subject to attrition. The cost of providing storage room is excessive and the extra handling of the coal increases the operating expense. If the storage is made underground, mine cars are used for that purpose, and then a greater investment in mine cars is required and an inevitably increased cost for sidings also will have to be met.

The converse of this case occurs when the preparator is to be operated on three shifts and the mine on one shift. Here it is again necessary to store coal. Two-thirds of the coal produced during the one mine shift must be handled or stored to supply the three-shift operation of the preparator. In this case, however, underground storage would be unreasonable, for if the coal were stored in the breasts, then it would be necessary to have three-shift operation of all underground work except cutting the coal. If the coal was stored in mine cars, then the hoist would run steadily in all three shifts. Either of these methods would make the operating costs so excessive as to be unworthy of consideration.

If the storage were on the surface the objections would be excessive degradation and the cost of constructing sufficiently large pockets and unloading and reloading machinery. Besides, the cost of rehandling this coal would add to the cost.

Therefore the conclusion must surely be reached that the storage of coal from the mine due to the single-shift operation of either mine or preparator is not feasible and would increase mining costs unreasonably.

If an anthracite mine were to be operated on the three-shift plan and the railroad would not make provision to furnish cars when they were needed, longer empty and loaded tracks would have to be provided for railroad cars, so that on the off-shifts a sufficient supply of cars might be on hand.

If a considerable number of anthracite collieries were put on the three full shifts and their outputs trebled, then there would be a tendency to overproduce, and the markets would be apt to be glutted. This would particularly affect the steam sizes, which under present conditions are sometimes quite difficult to dispose of.

It would be well to tabulate the ways in which triple shifting might be arranged, noting in each case the favorable or unfavorable results proceeding from a deviation from the time-honored plan of single-shifting mine and preparator.

Assumption No. 1: A mine of normal production operating under present methods, with the preparator run on a single shift. Assumption No. 2: An old mine with the preparator in good condition and operated with first and second mining. It is desired to place the mine on full three-shift operation so as to treble the output. Assumption No. 3: An old mine that can be operated by dividing the present force into three parts, each part working an integral portion of the mine, and operating the preparator on a three-shift basis, (a) by working different beds in different shifts, (b) by working different shafts, slopes or drifts in different shifts.

Assumption No. 4: The whole mine worked on a one-shift basis and the preparator on a three-shift basis. Assumption No. 5: A new mine with a preparator to be so planned as to operate on three shifts.

Assumption No. 6: A new mine to be laid out to operate on three shifts and the preparator on one shift, (a) the output to be the same as operating under present methods, (b) the output to be the maximum for each shift.

Assumption No. 7: A new mine, to be designed to operate on one shift and a new preparator on three shifts. Assumption No. 8: A consolidation of two or three collieries into one, each to be operated on a separate shift and the preparator to be operated on a three-shift basis.

Assumption No. 9: A consolidation of two or three collieries, each to be operated on three shifts and the preparator on a single shift. Assumption No. 10: A consolidation of two or three collieries, all to be operated on the same shift and the preparator on three shifts. Assumption No. 11: Two of three collieries to be abandoned and work to be concentrated in one colliery producing the same tonnage as obtained from the three. Both colliery and preparator to be operated on three shifts.

The ten main conditions that have to be considered in the multiple shifting of anthracite collieries are shown in the foregoing list and in Table II, p. 204. Besides these there are others which might arise in reference to any particular colliery.

Yet Some Conditions Favor Triple Shift

There may be individual cases where multiple shifting of anthracite mines might be advisable due to conditions that are not general throughout the fields. It might be advisable to adopt this method in case of an accident which would deprive men of employment and the company of output, or in case of a serious shortage of coal, or a pending expiration of the lease on a property. Such an operation would not be multiple-shifted for any saving in operating expenses or to obtain a continuous use of capital but to meet special conditions.

Double shifting instead of triple has not been mentioned, but the conditions and the items affecting this provision would be similar but less in degree. From a study of the preceding it will be clear that not one of the methods enumerated would be as economical and practicable as that in which mine and preparator work one shift at the same time and during the day.

TABLE II. THIRTEEN OPERATING METHODS WITH THEIR ADVANTAGES AND DISADVANTAGES LISTED AND SUMMARIZED

No.	Description	Assumptions: Number of Shifts Operated	Assumptions: Mine preparator	Labor: Disturbances	Labor: Need for Contract Work	Labor: Mine Efficiency	Labor: Outside Efficiency	Number of Men Underground: Miners	Pump Men	Foremen	Ventilation	Transportation	Hoisting	Silting	Development	Second Mining	Preparation Number of Men	Outside Number of Men	Cost of Mine Development	Cost of Preparator Equipment	Supply Account	Cost of Power	Coal Storage	Effect on Market	R. R. Car Supply	Number of Items: Favorable to Operation	Normal	Unfavorable to Operation	Conclusions
1	Mine of normal production operating under present methods	1	1	None	None	Nor.	Nor.	Nor.	Nor.	Nor.	Nor.	Nor.	Nor.	Nor.	Suf.	Suf.	Nor.	Nor.	Nor.	Nor.	Nor.	Nor.	Nor.	Nor.	Nor.	0	22	0	This is the present normal method of operating an anthracite mine, with which all the others are compared.
2	Old mine with preparator in good condition placed on three full shifts	3	3	Yes	Yes	Dec.	Dec.	Inc.	Dec.	Nor.	Nor.	Nor.	Nor.	Nor.	Insuf.	Insuf.	Inc,	Dec.	Dec.	Dec.	Dec.	Dec.	No.	Bad	Dif.	6	6	10	Both the inside and outside operating costs would decrease, but the preparation cost would increase. Serious labor troubles would arise and the efficiency of the men would be reduced. It also would be impossible to get sufficient development and the market could not absorb the coal.
3a	Old mine with normal output. Mining different beds	3	3	None	None	Dec.	Dec.	Inc.	Nor.	Inc.	Inc.	Inc.	Inc.	Inc.	Suf.	Suf.	Inc.	Inc.	Nor.	Nor.	Inc.	Inc.	No.	Nor.	Dif.	0	9	13	This assumption does not show any items that are in favor of the multiple-shift operation. Therefore it would be far less favorable than one-shift operation.
3b	Same as 3a but mining different openings instead of different beds	3	3	None	None	Dec.	Dec.	Inc.	Nor.	Nor.	Nor.	Nor.	Nor.	Inc.	Suf.	Suf.	Inc.	Inc.	Nor.	Nor.	Inc.	Inc.	No.	Nor.	Dif.	0	13	9	Labor efficiency would decrease, outside and preparation costs would increase, as would the power and supply accounts. There is not one item that is in favor of this assumption.
4	Old mine with normal output	1	3	None	None	Nor.	Dec.	Nor.	Nor.	Nor.	Nor.	Inc.	Nor.	Inc.	Suf.	Suf.	Inc.	Inc.	Nor.	Nor.	Inc.	Inc.	Yes	Nor.	Dif.	0	13	9	Mine operation is practically normal. Increased costs of preparation and for outside labor, together with storage of coal, make this assumption unfavorable.
5	New mine, maximum output on each shift	3	3	Yes	Yes	Dec.	Dec.	Inc.	Dec.	Inc.	Nor.	Nor.	Nor.	Nor.	Insuf.	Insuf.(*B*)	Inc.	Dec.	Dec.	Dec.	Inc.	Dec.	No.	Bad	Dif.	5	5	12	Labor troubles together with the increased cost of preparation and flooding of the market make up for any of the advantages gained by increased use of capital and decreased cost of power. There would be insufficient development.
6a	New mine with output same as if operating under present methods	3	1	None	None	Dec.	Nor.	Inc.	Nor.	Inc.	Inc.	Inc.	Inc.	Nor.	Suf.	Suf.(*B*)	Nor.	Inc.	Inc.	Nor.	Inc.	Inc.	Yes	Nor.	Nor.	0	11	11	Here no advantage is shown as likely to be gained from operating under this assumption. Operating costs are heavier, and there would be not enough development.
6b	New mine same as 6a but having maximum output on each shift	3	1	Yes	Yes	Dec.	Nor.	Inc.	Dec.	Nor.	Nor.	Nor.	Nor.	Dec.	Insuf.	Insuf (*B*)	Dec.	Dec.	Dec.	Dec.	Nor.	Dec.	Yes	Bad	Nor.	7	7	8	Labor troubles, decreased efficiency, the failure to secure development of sufficient working places and the storage of coal make up for any gain in reduction of operating expenses or more continuous use of capital.
7	New mine with normal output	1	3	None	None	Nor.	Dec.	Nor.	Nor.	Nor.	Nor.	Inc.	Nor.	Inc.	Suf.	Suf. (*B*)	Inc.	Nor.(*C*)	Nor.	Dec.	Inc.	Dec.	Yes	Nor.	Dif.	2	13	7	The decrease in the cost of the preparator and power would not make up for storage of coal and increased operating expenses.
8	Consolidation of three mines each operating on different shifts	3	3	Yes	None	Dec.	Dec.	Inc.	Nor.	Nor.	Nor.	Nor.	Nor.	Nor.	Suf.	Suf.	Inc.	Inc.	Nor.	Dec.	Dec.	Dec.	No.	Nor.	Dif.	3	12	7	Decreased efficiency of men, together with labor disturbances, increased outside and preparation costs are not counterbalanced by the decreased amount of capital, supply account and power costs. Hence this assumption is not feasible.
9	Consolidation of three mines each operating on different shifts	3	1	Yes	None	Dec.	Nor.	Inc.	Nor.	Nor.	Nor.	Nor.	Nor.	Nor.	Suf.	Suf.	Nor.	Inc.	Nor.	Nor.	Nor.	Nor.	Yes	Nor.	Nor.	0	17	5	This assumption approaches most nearly to present normal methods of operation. However, in five items this method of operation is not as favorable as one-shift operation.
10	Consolidation of three mines all on one shift	1	3	None	None	Nor.	Dec.	Nor.	Nor.	Nor.	Nor.	Nor.	Nor.	Inc.	Suf.	Suf.	Inc.	Nor.	Inc.	Dec.	Inc.	Dec.	Yes	Nor.	Dif.	2	13	7	The increase in cost of preparation, storage of coal and in cost of mine development is not counterbalanced by decreased preparator equipment and power costs.
11	Consolidation of three mines, abandoning two and tripling output of third.....(*A*)	3	3	Yes	Yes	Dec.	Dec.	Inc.	Dec.	Nor.	Nor.	Nor.	Nor.	Nor.	Insuf.	Insuf.	Nor.	Nor.	Dec.	Dec.	Nor.	Nor.	No.	Nor.	Dif.	3	11	8	The three decreases—in the number of pumpmen, cost of mine development and preparator equipment—do not counterbalance the losses caused by labor troubles, decreased efficiency of the men, impracticability of getting sufficient working places. So this assumption is unfavorable.

In this table, nor. means normal, as compared with assumption No. 1; inc., increase; dec., decrease; suf., sufficient; insuf., insufficient; dif., difficulties might arise.

(*A*) In this case the capital invested in the other two mines would stand idle and the upkeep, cost of pumping, repairs and watchmen would continue. (*B*) In case the mines were new and just starting — not old mines reopened — this would not apply. (*C*) Or increase.

What Is the Real Aim in Washing Coal and How Can Washing Efficiencies Best Be Calculated?

By Charting the Results of Coal Separation in Fluids of Different Densities a Specific Gravity Is Found Which Can Be Attained Without Too Great a Waste of Coal

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THE efficiency of any operation usually is regarded as the ratio between the useful work accomplished and the work that could be achieved by a perfect appliance. As the "sink and float" test is to be considered as a means of studying the efficiency of coal-washing operations, it is necessary that the true object of coal washing be clearly understood. If this be known, then the amount of useful work can be determined.

Undoubtedly the principal aim in a washing process is to reduce to a minimum the impurities in the coal, but in the process of eliminating the impurities a minimum quantity of good coal should be lost. Therefore we have as our object maximum reduction of impurities and maximum recovery of good coal.

A study of the impurities will show that they can be divided into two classes: (1) Inseparable impurities; those impurities which are incorporated in the structure of the coal itself in such a manner as to be an integral part of it. (2) Separable impurities; those impurities which are not an integral part of the coal structure and can be separated, provided they have been sufficiently liberated from the coal by breaking or crushing.

INSEPARABLE AND SEPARABLE IMPURITIES

Under the first class may come fine mineral matter that was deposited with the coal or was an integral part of it. This may be either ash-bearing material, as clay, silica, etc.; or sulphur-bearing material, as organic sulphur. The ash-bearing material may, however, make up such a large percentage of the mass as to throw it into the class of "bone" and instead of being an inseparable impurity it may then be an integral part of a separable impurity.

Separable impurities are such substances as fireclay, shale, silica, "bone," pyrite and gypsum. Generally speaking, the most important of these, as far as the washery operator is concerned, are clay, shale, bone and pyrite. Clay, shale and bone will be considered as ash-bearing impurities and pyrite as a sulphur-bearing impurity, and may be referred to as "ash" and "sulphur." Those wishing a fuller description of impurities and their occurrence are referred to a paper by Messrs. Frazer and Yancey.[1]

It is not within the scope of this paper to go into the theory of the separation of impurities from coal. A good exposition of this subject will be found in Mr. Drakeley's paper, "Coal Washing: A Scientific Study."[2] Separation depends mainly on the difference in specific gravity of the impurity and the coal, and on the possibility of mechanically unlocking the two. Specific gravities of bituminous coals and their impurities are given in Tables I and II.

It will be seen from the above data that the relative specific gravities of all the impurities with the exception of bone are so different from those of coal that theoretically there should be no trouble in separating true impurities from good coal. Most coals, excepting anthracite, have a specific gravity of less than 1.35 and impurities 1.65 or more. Where they are so mixed that we get material of intermediate specific gravity, however, separation may be more difficult. This is where the second factor of separation, of the particles, comes into the problem.

If the material can be crushed to such a state that each particle of impurity is broken away from the coal, theoretically there is hope for a clean separation. Whether or not crushing to such a point is practical depends on the size of the impure particles, allowable cost of crushing and type of machine in which coal is to be washed. Mr. Drakeley states that in coals tested for washing in jigs, ¾ in. was found to be the smallest practical size to which coal could be crushed for liberating ash.

Messrs. Frazer and Yancey give results of a test on a Pennsylvania bituminous coal which indicate that it should be crushed to ⅜ in. Evidently the fineness of crushing must be decided for each coal washed.

Up to this point the separation of coal and impurities

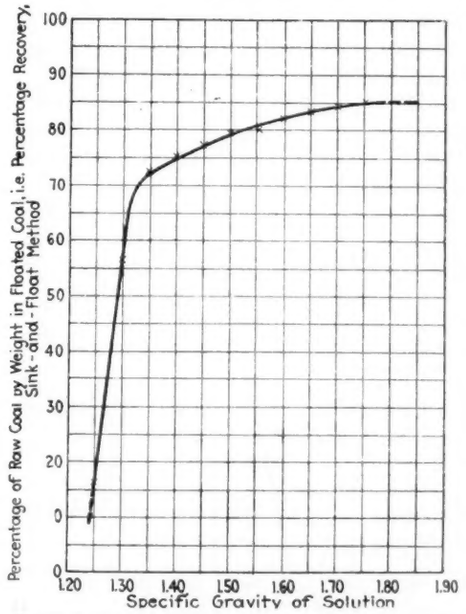

FIG. 1. CURVE SHOWING FLOAT OBTAINED ON DIPPING RAW COAL IN SOLUTIONS OF DIFFERENT DENSITIES

The difference in recovery between specific gravities 1.30 and 1.35 is 15.76 per cent but between 1.35 and 1.40 it is only 2.88 per cent. The difference in ash, as shown in Fig. 2, is 0.41 per cent between densities 1.30 and 1.35 and 0.46 between 1.35 and 1.40. Thus just below a density of 1.35 a reduction of 0.1 per cent in ash content reduces the recovery 3.84 and just above 1.35 an increase of 0.1 in ash content increases the recovery only 0.62. That is why 1.35 would be a good specific gravity on which to devide this coal. Above it too little is saved per per cent of ash added and below it too much is thrown away per per cent of ash deducted.

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[1] Bulletin No. 153, American Institute Mining Engineers, September, 1919.
[2] Transactions American Institute of Mining Engineers, Vol. LIV, page 418.

TABLE I—SPECIFIC GRAVITIES OF COAL AND IMPURITIES IN ILLINOIS COAL ACCORDING TO LINCOLN[3]

Coal Bed	Coal Field	Town	Bright Coal	Dull Coal	Bone	Shale	Pyrite	Calcite
2	Northern	Granville	1.14–1.16	1.20–1.21		2.03–2.64		....
2	Northern	Streator	1.15–1.20	1.20	1.42	2.50	2.43 (bone)	....
6	Danville	Danville	1.20–1.22	.....	.....	2.54–2.62	4.17 (partings)	2.10
6	Central	Pana	1.21–1.22	1.24	.....	.....	4.95 (crystal)	....
6	Central	Collinsville	1.20	1.25–1.31	.....	.....	.....	....
6	Southern	Carterville	1.26–1.30	.....	1.44–1.73	2.21–2.50	3.77 (partings)	....
6	Southern	Herrin	1.24–1.31	.....	1.47–1.91	2.41–2.59	.....	....
6	Southern	Marion	1.24–1.28	.....	1.47–1.95	2.26–2.47	.....	....

The values for specific gravity here given are lower than those given by other authors and than those determined subsequently in the mining laboratory of the University of Illinois. This difference is probably due to the fact that the values here given were determined without first heating the coal in hot water to remove the air—H. H. Stoek.

has been discussed. So-called coal grades gradually into bone, however, and it must be decided what is to be considered as "coal" and what as impurity. If by "coal" is meant a pure coal containing no moisture, sulphur or ash, then there is no such substance obtainable by any washing process. From the tables it will be seen that the possible constituents of raw coal may vary in specific gravity from 1.14 to a point well above 1.80.

Indeed it is possible to find carbonaceous material corresponding to most any specific gravity within this range. The question then becomes this: At what point can a line be drawn where all material having a specific gravity less than this shall be known as "coal," and all with a greater specific gravity as impurity? As this must of necessity be an arbitrary division, it follows that there is a great difference of opinion as to what is "coal" in washing operations and what is impurity.

Obviously the investigator must first set a certain standard. He must say to himself: "If I could make a perfect separation of my raw material into two groups, finished product and refuse, what would be the specific gravity of the dirtiest piece of material I would allow in my finished product?" In other words what would he like to keep and what discard? If he can answer this question, he can say: "Material having this or a lower specific gravity is "coal" and all other is impurity." Not that he ever hopes to attain this ideal separation in practice, but it gives him a foundation upon which he can base his value of 100-per cent efficiency.

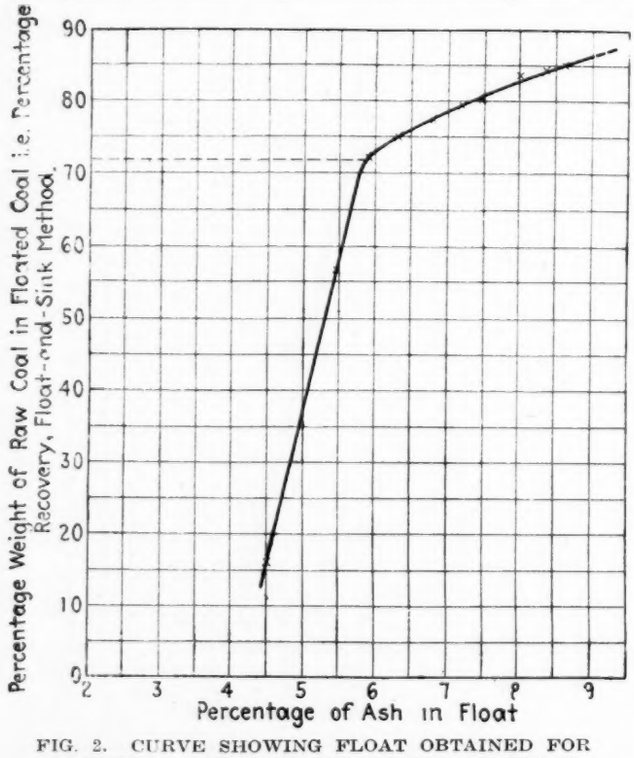


FIG. 2. CURVE SHOWING FLOAT OBTAINED FOR DIFFERENT PERCENTAGES OF ASH IN FLOAT

This curve is quite similar to that in Fig. 1. At 72.16 per cent recovery bone begins to come over. In fact it figures, for the whole range between 72.16 per cent recovery and 75.04, 17.8 per cent ash. Hence more than one-sixth of the material coming over is incombustible.

How is this limiting specific gravity to be selected? The "sink-and-float" test is a means of solving the problem. This test is based on the fact that by using a solution of a definite specific gravity it is possible to divide into two groups a sample of material in which the particles have various specific gravities, the separation being based solely on difference in specific gravity. It will be clear, then, that if the solution of the right specific gravity be found, the ideal separation can be made. Hereafter the material that floats will be spoken of as "float" and that which sinks as "sinkings."

If a series of solutions be made up, with specific gravity ranging from 1.20 to 1.85, and samples of the raw coal to be washed be tested in each solution, the amount of float and sinkings in each solution can be determined, and these products analyzed for ash and sulphur. If the results from these tests be tabulated and compared, the solution that gives the best separation, with the highest recovery of coal can be selected. The specific gravity of this solution is then that of the dirtiest particle that we wish to call "coal."

A simple method of selecting this specific gravity is given by Mr. Drakeley in his paper on coal-washing efficiency.[4]

From the tabulations showing the results of the sink-and-float test on the raw coal a curve can be plotted, the ordinates being the quantity of float in terms of percentage of weight of raw sample, and the abscissæ the specific gravities of the solutions in which the corresponding floats were obtained.

Table III shows the results from such a test and Fig. 1, the curve drawn from these results. If a second curve be drawn, using the weight of float (or the recovery) in terms of percentage of raw coal, as ordinates and the percentage of ash in the float as the abscissæ, it will be seen that there is a point at which the curve breaks sharply. (See Fig. 2.)

From this point on the percentage of ash in the float increases faster than does the amount of float, thus showing that some substance containing a far larger amount of ash than the material previously floated is now entering the float. In other words, up to this

TABLE II—SPECIFIC GRAVITY OF COAL AND IMPURITIES IN COAL ACCORDING TO DRAKELEY

	Range	Average
Coal	1.17–1.35	1.30
Bone	1.35–1.65	1.50
Carboniferous shale	1.65–2.15	1.85
Shale	2.15–2.55	2.40
Coal or shale with pyrite	2.55–4.80	3.65
Pyrite	4.80–5.20	5.00
Quartz	.....	2.60

Bulletin 320, U. S. Geological Survey gives the average specific gravity of 18 average coals as 1.34.

[3] Bulletin No. 69, University of Illinois Engineering Experiment Station.

[4] Transactions, American Institute Mining Engineers, May, 1920.

TABLE III—SINK-AND-FLOAT TEST ON A BITUMINOUS COAL

Specific Gravity of Solution	Recovery by Weight as Percentage of Raw Coal	Ash Content of Float Per Cent
1.25	16.25	4.50
1.30	56.40	5.42
1.35	72.16	5.83
1.40	75.04	6.29
1.45	77.62	6.76
1.50	79.55	7.19
1.55	80.36	7.43
1.60	82.44	7.49
1.65	83.72	7.96
1.70	84.53	8.32
1.75	85.14	8.59

point a fairly uniform product has been floated; from this point on, if the recovery is to be increased, it must be done at the expense of purity of the product.

Now if the object of washing be recalled, namely, maximum reduction of impurity and maximum recovery of good coal, it will be seen that the above point indicates as nearly as possible an ideal condition.

From Fig. 1 can be found the specific gravity of the solution giving this recovery. This specific gravity then is that of the dirtiest particle desired in the ideal washed coal. Mr. Drakeley found this specific gravity to be about 1.35 for the coals which he tested. Looking back at the tables showing specific gravities it will be seen that this checks fairly well with the dividing line between coal and impurities.

Solutions of 1.30 or 1.35 usually have been used by investigators as the solution for separating "coal" from impurities. This should be determined, however, for the coal to be studied. If a coal were made up largely of an inseparable impurity the point of break in the second curve would be found to correspond to a higher specific gravity, or if the coal contained only inseparable impurities uniformly distributed throughout the raw coal, there would be no break.

This, however, would not destroy the usefulness of the curve; the curve would show that the raw coal could not be separated into "coal" and impurities, and the maximum recovery would be the raw coal. The above curves are for ash-bearing impurities; sulphur could be treated in the same manner.

The limiting specific gravity having been selected, the investigator is now in a position to study the efficiency of a washing machine, or process. If a machine could separate all the particles of a specific gravity less than the standard from all particles of a greater specific gravity, it would be producing the ideal separation, and it could be said that the machine was 100 per cent efficient. For various causes such an exact separation as indicated is never effected in a practical machine, and in fact no operator would expect such a clean division, and in some cases would not desire it. However, this does give him a standard with which he can compare the work of his various machines, or the same machine at various times. These comparisons may be made as follows.

The raw coal as fed to the machine having been tested to establish the standard specific gravity, the next step is to test the products as delivered from the machine. The weight of washed coal and refuse as related to weight of raw coal should be determined, and then a sink-and-float test of the washed coal and the refuse made in a solution of the standard specific gravity. Table IV shows tabulated results of such tests. From Table III it will be seen that the raw coal has a purity of 72.16 per cent, if all material at or under 1.35 specific gravity be termed pure coal. The purity may, therefore, be raised 27.84 points in a perfect separation.

The washed coal shows a purity of 83.8 per cent. The purity has been raised 11.64 points out of a possible 27.84. It could be said, then, that the "cleaning" process has been 11.64/27.84 × 100 or 41.80 per cent efficient. This is termed "qualitative efficiency" by Mr. Drakeley.

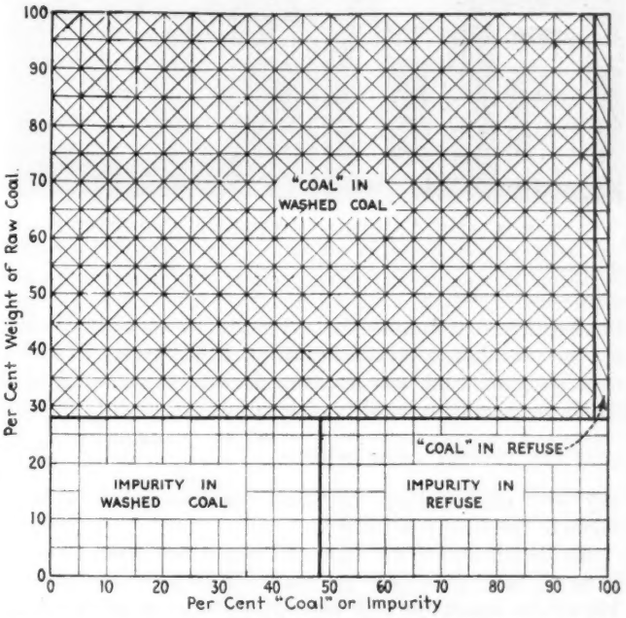


FIG. 3. GRAPHIC CHART SHOWING ALLOCATION OF "COAL" AND IMPURITY IN WASHED COAL AND REJECT

The impurity in the washed coal is not far different from that in the refuse but one is sweetened by 42.4 times as much "coal" as the other. Washed-coal float, 70.39 per cent; washed-coal sinkings, 13.61; refuse float, 1.66; refuse sinkings, 14.34. Total, 100.

This, however, does not deal with the percentage recovered. If all the pure coal or 72.16 per cent of the raw coal could be saved, the process would be 100 per cent efficient, as far as recovery is concerned. However, the washed coal contained only $\frac{83.8 \times 84}{100} = 70.4$ out of a total 72.16 per cent of pure coal, or the process was $\frac{70.4}{72.16} \times 100$ or 97.7 per cent efficient, as far as recovery was concerned. This is termed "quantitative efficiency."

As the object in washing was to be maximum elimination of impurity and maximum recovery, it would

TABLE IV—SINK-AND-FLOAT TEST ON WASHED COAL AND REFUSE

	Washed Coal	Refuse
Float	83.8	10.35
Sinkings	16.2	89.65
Percentage weight of raw coal	84.0	16.0

Percentage of raw coal that is washed-coal float $= \frac{84.0 \times 83.8}{100} = 70.39$

Percentage of raw coal that is refuse float $= \frac{16.0 \times 10.35}{100} = 1.66$

Percentage of total float in terms of raw coal $= 70.39 + 1.66 = 72.05$

Percentage of total washed-coal float to total float $= \frac{70.39}{72.05} \times 100 = 97.70$

Percentage of refuse float to total float $= \frac{1.66}{72.05} \times 100$, or $100 - 97.70 = 2.30$

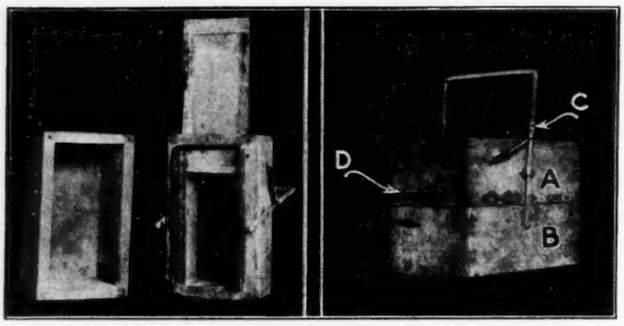
Percentage of raw coal that is washed-coal sinkings $= \frac{84.0 \times 16.2}{100} = 13.61$

Percentage of raw coal that is refuse sinkings $= \frac{16.0 \times 89.65}{100} = 14.34$

Percentage of total sinkings in terms of raw coal $= 13.61 + 14.34 = 27.95$

Percentage of washed-coal sinkings to total sinkings $= \frac{13.61}{27.95} \times 100 = 48.68$

Percentage of refuse sinkings to total sinkings $= \frac{14.34}{27.95} \times 100$, or $100 - 48.68 = 51.32$



FIGS. 4 AND 5. SINK-AND-FLOAT APPARATUS
A fixed 64-mesh screen in the bottom and a movable screen of the same fineness in the middle admit the solution when the apparatus is lowered into it and permit it to escape when the apparatus is removed.

be feasible to combine these results to show how near the process has come to attaining this result; 97.7 per cent of good coal was recovered, and it was improved 41.80 per cent in quality; therefore it might be said that the process came within $\frac{97.70 \times 41.80}{100} = 40.85$ per cent of fulfilling the ideal requirements. This is termed "general efficiency."

As stated above, an operator might not wish to separate his coal into two groups indicated by the curves. He might select the ash percentage that is allowable in his product and accept the corresponding recovery as that expected from his machine or plant. Having done this he might then infer that as long as the machine gives this recovery and the product contains no more ash than the limit set, it is 100 per cent efficient. Is this true? It is true that he may be getting a higher yield than he would if he cleaned the coal nearer to the ash content indicated by the curve and still have a product within the limits demanded. It might be feasible, however, to run the machine so as to approach more nearly to the ideal separation, and then, if he wished, dilute the washed coal with raw coal till the ash limit was reached, thereby giving his entire plant a greater output with the same number of machines. If this proved successful, the machines certainly were not running at 100 per cent efficiency in the first case.

G. R. Delamater[5] describes a chart originated by Dr. Hancock, by which the results of the above tests may be shown graphically. A square is drawn on co-ordinate paper. The left side and bottom are each divided into divisions representing percentages. The percentage of raw coal that sank in the standard solution is laid off on the left side, and through this point a horizontal line is drawn, dividing the square into two areas. This line is marked with the specific gravity of the standard solution.

The upper area represents the amount of good "coal" in the raw coal, and the lower the amount of impurities in the raw coal. Next, the percentages of total impurity found in the washed coal and of total "coal" found in the washed coal are laid off on the standard solution line. Vertical lines are then drawn from the first point down to the bottom of the chart and from the second point to the top of the chart.

These will divide the square into four areas, which represent "coal" in washed coal, "coal" in refuse, impurity in washed coal, and impurity in refuse. By coloring or cross hatching these in different manners, the chart shows at a glance the type of work being done by the machines or plant.

[5]COAL AGE, May 2, 1914.

There are several ways in which the sink-and-float test may be made. I prefer to use a zinc-chloride solution and the type of apparatus shown, which is a modification of an apparatus suggested by Mr. Drakeley. It consists of two boxes, *A* and *B* (see Figs. 4 and 5), of the same size, 8 x 4 x 3 in. *A* has for its bottom a sliding screen (60-mesh), while *B* has a fixed screen bottom (60-mesh); *A* has a projecting guide at the bottom which fits into the top of *B*, and the handle *C* is so made as to lock the two together when brought to an upright position.

To carry on the test the boxes are locked together, the screen pulled out and the boxes submerged in the solution. A 300-gram sample is then dumped into *A*. The sample is stirred for 10 minutes so that all particles are thoroughly wetted, and then allowed to settle for 20 minutes. The screen *D* is inserted, the boxes lifted out and the solution allowed to drain out. The boxes are then separated and placed under a warm-water spigot. The sinkings will, of course, be in box *B* and the float in box *A*. The apparatus is very simple, easy to use, and saves much time and trouble.

Use Two Safety Valves on Boilers, Though These Devices Have Their Dangers*

BY WARREN HILLEARY†
Boston, Mass.

PROVIDE at least two safety valves on every steam boiler, for the reason that if only one valve is installed it may fail when needed. It is evident that if there are two or more safety valves there will be less likelihood of excess pressure being raised on the boiler than if only one is used.

Whether the valves should be mounted on a "Y" or other base, the single outlet of which connects with the boiler, has been frequently debated, and apparently there is no objection to this provision.

A means should be provided for lifting the valve disk from the seat for testing purposes. This should be so readily accessible that the attendant can open the safety valve while the boiler is under pressure, without danger of being burned by contact with hot parts, without having to grope about for a cord or lever, without climbing a ladder, and, preferably, from a point where the pressure-gage and the water-gage glass can be viewed while the disk is being held off its seat, for in operating practice it too frequently occurs that the boilers are being worked beyond normal rated capacity, and if the water chances to be quite high in the boiler, the lifting of the disk when the gage pressure is up to within a pound or two of the blowing point may cause water to be carried into the steam line. If both the pressure gage and the water-gage glass are visible from the point from which the disk is raised, the action of the water in the glass often will indicate to the attendant whether the disk should be instantly dropped or whether it is safe to hold it open for a few seconds.

The discharge outlets of the safety valves should, of course, be so arranged that there will be no likelihood that any person will be scalded or have dust blown into his face and eyes when the safety valves open, but it is not desirable that the outlet be piped further than absolutely necessary. The piping should be as straight

*Excerpt from a paper entitled "Safety Features of Steam Boiler Accessories," read before Engineering Section, National Safety Council, and the Philadelphia Branch of the American Society of Mechanical Engineers.

†Superintendent, Royal Indemnity Co.

as possible and no more than one bend or elbow should be allowed in the line, and this angle in the pipe should have at least a one-inch free drain at the lowest point unless the discharge outlet is less than one inch. In that case the drain need not be so large. Cases are on record where persons have been scalded by the discharge from the safety valve and also where severe injuries to eyes have been caused by dust being blown from the tops of the boilers into the eyes of attendants.

In some plants a ¾-in. pop valve is installed on each boiler. This valve is set to blow off at pressures 2 or 3 lb. lower than will actuate the main safety valves. The blowing of this pilot valve, which makes much noise, will warn the attendants that the main valves are about to blow, and it might be a good idea to place these pilot safety valves on every boiler, for the expense is not great, and it is advantageous to know when the main valves are about to blow.

An Alloy That Resists High Temperatures

CALITE is a new alloy that melts at 2,777 deg. F., softens at 2,500 deg., is safe to use at temperatures not exceeding 2,200 deg. and may be used at a temperature of 2,370 deg. without bad results. Its specific gravity is 7.03, its weight per cubic inch is 0.25 lb., its specific heat is 0.123, its thermal conductivity is one-quarter that of iron and in cooling from molten to cold it shrinks ¼ in. per foot. The elastic limit is 36,800 lb. with a reduction of area of 2 to 3 per cent and an elongation of 1 per cent.

The Brinell hardness (annealed) is 286 and the scleroscope hardness (annealed) 40. The transverse strain test showed that a 1-in. square bar on supports at 12-in. centers broke at 4,250 lb. Calite containers are used for carbonizing or case hardening, annealing, heat treating and for holding molten lead, salts and cyanides. It also is adaptable for furnace parts, heat exchangers and recuperators.

Calite can be cast into boxes, retorts, pots and other containers for antimony, babbitt metal, pure copper, lead, tin, type metal, calcium chloride, sodium chloride, potassium chloride, barium chloride, nitrates, cyanides, case-hardening compounds, carbonizing compounds, sodium carbonate and acetic acid. It may be used in the presence of ammonium-chloride fumes, sulphur vapors and saturated sea-salt vapor. The Calorizing Co. of Pittsburgh is the manufacturer.

Beware of Even Low-Voltage Current*

BY S. E. WHITING†
Boston, Mass.

SKEPTICS will tell you that if a man does not have a weak heart he will not be injured by a low-voltage current, but this is no excuse for such accidents, for we have no license to kill the weak-hearted. The action may sometimes be a paralysis of certain nerves, causing a suspension of breathing and sometimes an interference of heart action. Again death may come from inhaling the poisonous fumes from a flash of current.

The susceptibility of individuals varies. One authority has gone so far as to give the figure 100 milliamperes as the minimum current that will prove fatal. However, Dr. Cannon, of Harvard, chairman of the National Commission on Resuscitation from Electric Shock, recently told me that a more important factor than the quantity of current is the path which it takes through the body. He has found that different physical effects are produced in different shock cases, and he emphasizes the importance, regardless of all other considerations, of immediately applying artificial respiration in every case where the breathing stops.

Indications are that some shocks cause immediate suspension of breathing with the heart continuing to beat. Other shocks first cause only a dazed condition, with collapse occurring some minutes later. Others show no suspension of animation at all, but death occurs days later from extensive burns, particularly in high-voltage cases. Some cases show small skin burns or punctures due to localized contacts of the body with the live parts of the circuit; others show no external evidence that the man has been subjected to shock, yet the attendant condition as to position of the body and charge on the apparatus made it certain that a shock had been received.

Your claim department may argue in a particular fatality that electric shock is not the cause, as no burns can be found on the body. Personally I believe it is quite possible to pass a fatal current through a man without causing any surface marks whatever. The only essential is that the body contacts be of large area and firmly made, as happens when a metal switch handle is gripped and the feet of the victim are in water.

*Excerpt from article entitled "Lessons Learned from Forty Electrical Fatalities," read before the Engineering Section of the National Safety Council and the Philadelphia Branch of the American Society of Mechanical Engineers.

†Assistant chief engineer, Liberty Mutual Life Insurance Co.

One Screw Holds Clamp to Both Hanger and Wire, Making Short and Easy Suspension

THE General Electric Co. has recently developed a form of combination clamp and hanger especially designed for use on mine trolley lines, where the saving of headroom is of great importance. Not only is it easier to install but it is less expensive and saves half an inch in headroom.

It consists of two parts, the suspension and the clamp. The suspensions resemble those formerly manufactured as standard by the company, with the difference that the threaded stud is replaced by one with a button head. The clamp fits directly over the button head of the stud and is held by tension, having a groove that matches the flange on the stud. The same screw that holds the clamp to the wire also holds it to the stud of the suspension. The gain in headroom is obtained by the elimination of the nut that was formerly necessary to fasten the ear to the suspension. The device then is easier to install.

DISASSEMBLED SUSPENSION AND CLAMP

The top of the clamp fits over the button-head stud of the hanger much as the lower part fits over the wire, and one screw holds them both.

Problems of Operating Men

Edited by James T. Beard

Two Important Questions in Ventilation

Abandoned Places Not to Be Sealed Off—Ventilate Such Places by a Scale of Air—Run Fan Continuously to Avoid Danger of Dust and Gas—Remove Dust and Sprinkle Roadways Once a Week

PERMIT me to refer to two interesting questions relating to mine ventilation, which were presented for discussion at a recent meeting of the Coal Mining Institute of America and reported in *Coal Age*, Nov. 3, p. 734. The questions read as follows:

1. "When a section of a mine is entirely worked out and abandoned would it be proper to seal off the section or should it be ventilated?"

2. "In a mine in which firedamp has never been detected and which is worked entirely by open lights but in which only permissible explosives are used on account of the dryness of the dust, should the ventilating fan be run continuously or should it be stopped on Sundays, holidays or idle days?"

Danger in Sealing Off a Section

In answer to the first question, let me say that, under no conditions could an abandoned part of a mine be sealed off. In my opinion, this is a very dangerous practice, owing to the liability of the accumulation of gas in such places that would be void of ventilation when sealed.

Experience teaches that the gases, which always accumulate in poorly ventilated places, are chiefly carbon monoxide (CO) and carbon dioxide (CO_2). As is well known, the first of these two gases is extremely poisonous.

In a dry and dusty mine, the cutting off of the air by sealing an abandoned section would be liable to start slow combustion in the gob, owing to the resulting increase in temperature, particularly if moisture is present in the workings. Under such conditions, large quantities of carbon monoxide would be produced, because of the limited supply of air.

Explosion May Result Where Gas Is Present

This gas is not only poisonous but inflammable. The danger is much increased if any considerable portion of methane or marsh gas is being given off from the roof or floor. The ignition of the gas from any cause would result in an explosion, as there is always sufficient free air within the sealed portion to make that possible.

Should the roof be a hard sandstone and a fall of rock take place, it is possible for sparks to be struck and ignite the gas, which has been shown to have occurred in some instances, I believe.

Again, it may happen that the operator has in mind the purchase of adjoining property when the headings reach the property line. In that case, large abandoned areas sealed off would prove a serious menace to safety, in the later development of the mine.

It is practically impossible to seal off large areas so that air and gases will not pass in and out through the seals and crevices in the seam and enclosing strata. Where the intake air current is carried past such abandoned sections that are sealed it generally becomes foul before reaching the live workings.

My conclusion is that it is highly unsafe to seal off large abandoned areas. Instead, they should be ventilated by a sufficient scale of air to prevent the accumulation of gases within the section. This has been my practice and I regard it as a safe one to follow.

Safety Requires a Ventilating Fan To Be Run Continuously

The second question, regarding the stopping of the ventilating fan on Sundays, holidays or at other idle times is a practical one and well worthy of discussion. It is stated that, in this case, the mine is worked by open lights.

In my judgment, a ventilating fan should be run continuously, day and night. One reason for so doing is to avoid the increase in temperature in the mine that always occurs when the fan is stopped. Then, it will not be long, particularly in a large mine, for dangerous quantities of gas to accumulate in the workings.

It is a common thing, in mining practice, for many rooms being driven to be poorly ventilated. Some are driven too far ahead of the air, or the breakthroughs are small and little air reaches the working faces. These conditions favor the accumulation of blackdamp and other gases, which take time to remove, after the ventilating current is restored.

It will generally be found that more time will be required to restore the air in these places and make them fit for work, and the cost will be greater than to keep the fan running continuously at a speed sufficient to prevent the accumulation of gas.

Again, there is always the possibility of a sudden breakdown of the fan ventilating a mine. The operator will be fortunate if this does not occur at a time when he is striving to clear the mine of gas that has accumulated during an idle period. Only in exceptional cases, where the mine is not dry and dusty, would I consider it safe to shut down the fan on Sundays, holidays and other idle times.

———, Tenn. MINE FOREMAN.

Alabama Law re Gaseous Mines

Important points relating to gassy mines not mentioned in the Alabama law—Pennsylvania law discriminates clearly between mines that do and those that do not generate gas.

READING the last paragraph (c), in the answer to the second examination question in *Coal Age*, Nov. 10, p. 769, I was surprised to find that several important points appear to be omitted in the Alabama law relating to mines generating gas.

The portion of the question to which I refer reads as follows: "Does it (the Alabama Mining Law) discriminate between gaseous and non-gaseous mines?" This question was asked at a recent first-class, mine foremen's examination, held at Birmingham last July.

The answer to this part of the question names three sections of the mine law that discriminate between mines generating gas and those free from gas. The requirements mentioned in these three sections are the following:

What the Law Requires in Respect to Mines Generating Gas

Sec. 27, requires that the mine foreman in charge of a gaseous mine shall hold a first-class certificate. Sec. 30, specifies that the mine shall be sprayed or sprinkled; and Sec. 32, requires the employment, in such mines, of a competent fireboss and specifies his duties.

The section states that the fireboss shall examine every working place, in the morning, before the men are permitted to enter for work, and inform each man in whose place he may have found a dangerous quantity of gas, telling him of the condition of his place.

It states, further, that the examination shall be made by the fireboss every morning, using a safety lamp for that purpose. The fireboss is required to leave a conspicuous sign or mark at the neck of each room and at a point 25 ft. distant from the face of each slope, drift or heading where gas is found in dangerous quantities.

What is strange to me is that this should be the extent to which the Ala-

bama mining law discriminates between gaseous and non-gaseous mines. I fail to understand how an examination fulfilling these requirements would make known the true condition of a working place.

First, no time is specified for the examination to begin, which may be from two-and-one-half to three hours previous to the men going to work. Neither is any mention made of the mark that the fireboss should leave at the face of each place examined, as evidence of his presence in the place that morning.

Finding gas in a place, the law requires the fireboss to leave a conspicuous mark or sign at the neck of a room, or at a point 25 ft. back from the face of a heading. Granting that this requirement will sufficiently warn a miner working in a room where gas has been found, let me ask, What about the entry or heading that is generating gas in dangerous quantity?

Warning Insufficient in Headings

The entryman, hurrying to his work, looks for the mark, if he gets that far, which the fireboss is directed to leave 25 ft. back from the face. Two-and-one-half hours before, the fireboss found gas at the face of this heading. Will any one deny that the chances are good for the miner's open light to have ignited this gas at a distance of 40 or 50 ft. from the face, when he was approaching for work?

What appeals to me is the absence of any measure of safety provided by this requirement in the Alabama law. Moreover, does not the law require the fireboss to look for other dangers than gas, in each working place he examines, and report the same and hold back the checks of the men working in such places where danger is found?

Allow me to contrast this feature of the Alabama law with the like requirement in the Pennsylvania bituminous law, which makes the presence of gas, in dangerous quantity, depend on the gas being detected on the flame of an approved safety lamp, and requires that such places shall be worked with locked safety lamps.

No one will deny that this is a precaution that insures safety. If the fireboss has found gas in a place, the man working the place is not permitted to proceed to work, until the gas has been removed and the place made safe.

Gans, Pa. R. W. Lightburn.

Do Years Make Safe Workers?

Experience seems to breed indifference to danger — Man who thinks he "knows it all" is obstinate and difficult to handle.

TO THE QUERY contained in the headline I answer an unequivocal "No." The longer a miner works underground the less he thinks of the danger surrounding him and the more difficult it becomes to instill into him the need of carefulness.

This does not apply to all classes of miners, but some have an idea that they "know it all." A person can tell them one thing and when he is gone they will do the exact contrary. A green man, on the other hand, can be made a good miner if the foreman explains to him carefully the work he is expected to do. In time he will become an excellent miner.

I think that in most mines a master miner should be employed who understands all phases of coal getting. This is not needed except in an operation where few skilled miners are to be found and where most of the workmen come out of the shop or from the farm.

Rawdon, Quebec. C. McManiman.

Where Mining Laws Fail

Many weak points in our state mining laws—Integrity of examining boards a controlling factor—Law providing for their appointment — Uncertified foremen to serve until next board meets.

BEING a firm believer in the certification of mine officials, like many others, no doubt, I have been impressed with the excellent letter of John Wall, Sr., *Coal Age*, Nov. 17, p. 807, bearing on the value of the certificate law.

If any one has any misgivings as to the practical value of that law in the operation of coal mines he needs but to refer to the citation of its history in Pennsylvania, as outlined by Mr. Wall, whose dates and figures show clearly what has been accomplished in Pennsylvania.

What the Law Has Accomplished in Other States

Like facts could be shown in respect to every coal-mining state where certification has been made a law. Every state has had its share of mine disasters; and a comparison of those that occurred before, with those following the enactment of the law requiring the certification of mine officials, will prove the value of that law in each instance. Pennsylvania does not stand alone in that regard.

In our own state of Colorado we have been pleased to note that mine disasters have been materially decreased, we might almost say, eliminated, through the strict observance of the requirements of the new law and the constant, thorough inspection and supervision of all work by the officials in charge.

It is with some hesitancy that I offer a few suggestions on points essential to the safeguarding of mining operations. Many or perhaps all of these points have been mentioned, at different times, in *Coal Age;* but I will briefly outline some of these as they recur to my mind.

Integrity of State Examining Boards Important Factor

First in order is the integrity of our examining boards. For this we must depend almost wholly on the personal honesty of the individual members of these boards. Of course, it is understood that immediately following the organization of a board, each member takes a solemn oath before a duly authorized officer, pledging himself to perform the duties of examiner to the best of his ability.

Every man on an examining board in recommending or rejecting the application of a candidate, is pledged to be governed solely by the evidence of the person's qualifications, under the law, and his fitness for the position he desires, without consideration of any political or personal prejudices.

Where the mining law requires the proper administering of such an oath to each board member, the result should insure the just and fair treatment of every candidate in the examination. But how many of our state mining laws make mention of the form of oath required to be taken by board members upon being duly appointed.

Appointment of Examining Boards Should Eliminate Politics

Let me say a word, here, as to the appointment of members of an examining board and suggest what appeals to me as an ideal method of appointment. I will assume the entire field is divided into three districts. At the proper time let the Governor notify a judge presiding in each district, asking two of them to appoint, from their respective districts, a reputable coal miner, if possible, selecting men who hold first-class certificates.

At the same time, in like manner, the third judge should be asked to select a mine owner or mine superintendent of good repute and standing, thus making three members to serve on the said board. The Governor himself should then choose a prominent coal-mining engineer as a fourth member of the board, while the chief mine inspector of the state would constitute a fifth member.

It seems to me that this method of appointment would remove the board as far as possible from political influence. Each member would be a coal-mining man and, let me add, it would be preferable to select each miner on the board from among those who hold certificates received at a previous examination.

The Law in Pennsylvania

In regard to the Pennsylvania law authorizing a mine superintendent to appoint an uncertified man as foreman, provided that, in the judgment of the superintendent, he has the same qualifications as a certified man, I would only say that the law should have restricted the service of such an uncertified foreman to the time of the holding of the next examination, when he should be compelled to get a certificate or give up his place as foreman.

To my mind, such a reading of the law would, in no way, impair the requirement of certification of foremen and other mine officials. I will say in closing that, since certification became a law in Colorado, all superintendents are looking for certified men, believing that they make better and safer foremen. Robert A. Marshall.

Walsenberg, Colo.

Certifying Mine Superintendents

What the Tennessee Mining Law requires of mine superintendents—Instance of certified officials at one large colliery—Limiting the life of certificates advocated.

SOME of the remarks made in the interesting letter of John Rose, former district mine inspector in Tennessee, which appeared in the issue of *Coal Age*, Oct. 27, p. 684, surprised me greatly. In addition to what I said in a previous letter urging the certification of mine superintendents, I want to offer a few comments on this subject.

I fully agree with Mr. Rose's statement that "the superintendent looks after the construction work of the entire operation, both outside and inside of the mine." On the other hand, I can hardly endorse his idea that the Tennessee mining law is lacking in its requirements regarding the qualifications of the chief mine inspector of the state.

Chief Inspector's Qualifications Required in Tennessee

True, the law does not stipulate that the chief mine inspector shall hold a "Class-A" mine-foreman's certificate, as is required of each district mine inspector. But the law does particularly specify the qualifications the chief mine inspector is required to possess, in the following terms:

> No person shall be appointed chief mine inspector, unless he is possessed of a competent knowledge of chemistry, geology and mineralogy of Tennessee, so far as these sciences relate to mining, and has a practical knowledge of mining engineering and the different systems of working and ventilating mines, and the nature and properties of the noxious poisonous and explosive gases found in the mines and the best means of preventing dangers and the removal of same, and shall have had ten years' experience in mining.

Under this law, the chief mine inspector of Tennessee is supposed to be a qualified man. I want to ask, How could it be known that a candidate for this position possesses the knowledge and the qualifications mentioned in the section of the law just quoted, unless this is proved by the examination of candidates for that office.

Why Are Not Mine Superintendents Certified by Law?

In this connection, allow me to state that if the law recognizes the need of qualified mine inspectors and requires their certification and (Sec. 12) the certification of mine foremen, assistant foremen and firebosses in the state, why does not the law require a like certification of mine superintendents, who oversee and direct the work of mine foremen?

Speaking of an uncertified superintendent giving orders to a certified foreman that, if carried out, would endanger life, Mr. Rose says he sees "nothing to hinder the foreman from disobeying such orders."

No one will deny that a mine foreman, in spite of his experience being in conflict with the orders of the superintendent, will carry out those orders or get off the job. Many an experienced foreman, under such circumstances, has resigned and gone home rather than be responsible for doing what his experience tells him would endanger the lives of men working in the mine.

Qualified Men at One Large Colliery

Just here, let me cite one instance of a large coal operation, in Tennessee, where the general manager, the mine superintendent and the mine foreman are all holders of "Class-A," mine-foreman certificates. The daily output of the mine exceeds 1,000 tons and safety-first is practiced in every branch of the work.

Before closing, I want to endorse the suggestion of Mr. Rose regarding the limitation of the life of all certificates. I would say the life of a certificate should not exceed four years, which is the length of time prescribed by law for the term of office of the chief mine inspector.

To my mind, it would be well to do away with the issuing of "Class-C" and "Class-B" certificates. In my opinion, all mine foremen and assistant foremen should have a full knowledge of mine gases and understand their danger and behavior in the mine, since gas is liable to be generated, at any time, in a mine classified as "non-gaseous."

I want to urge again the need of examining and certifying all mine superintendents, who are worthy of no greater consideration than mine foremen by reason of their higher office and who are, in the end, responsible for what is done in the mine.

OSCAR H. JONES.

Crawford, Tenn.

Inquiries Of General Interest

Best Method of Sinking a Shaft

Shallow Shaft Sunk from Surface—Method Safer, More Economical and Better Than Driving an Upraise from the Mine Below

IN order to provide better ventilation in our mine, it has become necessary to sink an airshaft. The depth from the surface, at the point where it is proposed to sink this shaft, is only 70 ft. The coal is overlaid with six feet of slate, above which are four feet of sandrock, the remaining strata being alternate clay and shale covered with a few feet of drift. It has been suggested that, for one or two reasons, it would be better to drive an upraise from the mine, instead of sinking the shaft from the surface.

First, it will be necessary to locate the point on the surface that will be directly above the desired location in the mine. Second, in driving an upraise, the material excavated can be dropped into the mine and there utilized for building stoppings or stowed in the waste. In addition, there will be the saving of the expense for hoisting the excavated material and for draining the shaft by pumping.

These advantages have appealed to us and we are writing this hoping to receive the advice and suggestions of *Coal Age* and its many practical readers.

SUPERINTENDENT.

——, Pa.

There is no question but that the points named by this correspondent are an advantage, in the driving of an upraise, over the usual plan of sinking a shaft from the surface. On the other hand, when the need of employing men who have had experience in such work, and the increased danger to the workmen are considered, many will decide in favor of sinking this shallow shaft from the surface and will adopt such plan, unless there are particular reasons for doing otherwise.

If a shaft is to be sunk from the surface the safest plan, in order to avoid any error in location, is to sink one or more drillholes on the proposed site. The position of these holes in the mine will enable an accurate location to be made on the surface. Again, a drillhole in the shaft, if kept clear, will afford ample means of drainage and avoid the necessity of pumping, during the time of sinking.

It will often happen that the cost of handling the excavated material, in driving an upraise and stowing it away in the waste places in the mine, will overbalance the cost of hoisting the same material to the surface, in sinking the shaft and dumping it in the usual manner. Expense for draining the shaft is obviated by the drillhole.

Taking everything into consideration, we think that the sinking of a shallow shaft from the surface will not only be safer, but prove more economical and quicker, in the end, than to attempt to drive an upraise from the mine. In driving an upraise trouble increases where the strata are soft and not self supporting. In the present case, there are but ten feet of slate and sandrock, the remaining sixty feet being material that is not self-supporting, under general conditions. We shall be glad to receive the suggestions and advice of practical miners, on these points.

Examination Questions Answered

Miscellaneous Examination Questions

(Answered by Request)

QUESTION—*If a breast is driven a distance of 500 ft. on a rising grade of 10 per cent, what vertical height has the breast attained above the gangway level and what should be the distance represented on the mine map?*

ANSWER—The distance of 500 ft. is assumed, in this case, to be measured on the pitch. The vertical rise, for a grade of 10 per cent, may be estimated as one-tenth of the pitch distance or 50 ft. The corresponding horizontal distance is $\sqrt{500^2 - 50^2} = \sqrt{247{,}500} = 497.5$ ft., which is the distance represented on the mine map. If the map is drawn to a scale of 100 ft. to the inch, the measurement on the map is 4.975 inches.

QUESTION — *Why are permissible powders safer than black powders?*

ANSWER—Permissible powders are safer than black powders for at least two reasons: 1. A smaller charge of the powder suffices to do the same work. 2. Permissible powders are practically flameless.

QUESTION—*To light a mine with 200 lamps of 16 cp. each, what amount of mechanical energy would have to be available for conversion into electricity?*

ANSWER—A 16-cp. lamp may be assumed to consume from 50 to 56 watts of energy. Estimating on the maximum amount, the total electrical energy required would be $200 \times 56 = 11{,}200$ watts. The efficiency of the dynamo may be taken as 90 per cent and, since 1 hp. is equivalent to 746 watts, the power transmitted by the belt driving the dynamo is

$$H = \frac{11{,}200}{0.90 \times 746} = 16.68 \text{ hp.}$$

Now, assuming the efficiency of the engine driving the dynamo as 85 per cent, the total indicated horsepower (i.hp.) is

$$I.\ hp. = \frac{16.68}{0.85} = 19.62, \text{ say } 20 \text{ hp.}$$

QUESTION—*A siphon has its short leg, 10 ft. vertical, and long leg, 20 ft. vertical, and is 6 in. in diameter, with a total length of 100 yd. Find the flow, in gallons per hour, allowing for frictional resistance.*

ANSWER—It is never safe to calculate the discharge of a siphon without first ascertaining whether conditions are such that it will run dry, or in other words tend to empty itself, which will always be the case if the flow of water in the short leg, under atmospheric pressure, is less than the discharge in the long leg, under gravity. At sea level, the water column supported by the atmospheric pressure is practically 34 ft.; and, assuming that the short leg, in this case, is 100 ft. long and the long leg, say 200 ft. long and the uniform diameter of the pipe, 6 in., the relative flow in each leg of the siphon, calculated independently, is as follows:

Short leg,

$$\frac{34 - 10}{2.08 \times 6 + 100} = \frac{24}{112.48} = 0.213$$

Long leg,

$$\frac{20 - 10}{2.08 \times 6 + 200} = \frac{10}{212.48} = 0.047$$

The flow in the shorter leg being the greater of the two, there is, therefore, no danger of this siphon running dry.

The discharge of a 6-in. siphon 300 ft. long, having a rise of 10 ft. and a fall of 20 ft., is calculated thus:

$$G = 6^2\sqrt{\frac{800 \times 6(20 - 10)}{2.08 \times 6 + 300}}$$

$$= 36\sqrt{\frac{48{,}000}{312.48}} = 446.18 \text{ gal. per min.}$$

The discharge of this siphon is, therefore, $60 \times 446.18 =$ say 26,770 gal. per hr. It is important that both ends of the siphon be submerged and that an air trap be provided at the crown or summit to collect the air given up by the water.

QUESTION—*Describe your course of action, as mine foreman, to comply with the state mining law, in case a fatal accident occurred in the mine under your charge.*

ANSWER—The duty of the mine foreman is to notify the superintendent or operator, who must, within twenty-four hours of the time of the accident, report the same to the chief of the Department of Mines and to the district mine inspector, giving full details in writing on the printed forms furnished by the Department of Mines (Sec. 83).

QUESTION — *As mine foreman at a gaseous mine, what instructions would you give to your firebosses relative to the performance of their duties and how would you ascertain whether or not your instructions had been obeyed?*

ANSWER—The foreman of a gassy mine must know that each fireboss he employs is competent and conscientious in the performance of his work. Each fireboss should be instructed to be at the mine, at least fifteen or twenty minutes before the time for him to begin his inspection, in order to enable him to properly examine and prepare his lamp, ascertain the condition of the ventilating apparatus, note the barometer reading and feel assured that there are no unusual conditions prevailing in the mine, as far as this can be ascertained from the surface.

On entering the mine, each fireboss should proceed to his own district and make a careful examination of every working place, by following the air current, making careful tests with his lamp as he proceeds. He should be instructed, also, to note any other dangers than gas, in each place examined, and to place the necessary danger signals where danger is found. Finally, on returning to the bottom or entrance to the mine, each fireboss must make out a full report, stating what dangers, if any, he has found, giving the location and nature of each and withholding the checks of the men working in such places.

By closely observing the conditions when making his own rounds of the mine and by carefully reading the reports of each fireboss, the mine foreman should be able to tell whether or not his instructions are obeyed.

QUESTION—*A certain mine has been abandoned and the adjoining mine is working towards the abandoned workings. State fully what you, as foreman, would do to safeguard the men under your charge and comply with the mining law of West Virginia.*

ANSWER—As far as possible, the abandoned mine should be explored in the region lying next to the live workings that are approaching it. Where that is possible a careful survey should be made of the coal face and the survey plotted on the present mine map. However, no reliance should be placed on any surveys; but advance headings should be driven toward the abandoned workings. These headings should be driven not over 8 ft. in width and protected by one borehole, kept 8 or 10 yd. in advance of the face, and other holes drilled in each rib and making an angle of 45 deg. with the entry. These flankholes should not be less than 18 or 20 ft. in depth. Only safety lamps should be used in driving these headings and wooden plugs should be kept ready for instant use in case a borehole strikes through into the abandoned works.

QUESTION — *(a) What precautions would you adopt to reduce to a minimum the production and distribution of coal dust in a coal mine? (b) What are the duties of a mine foreman regarding dry and dusty conditions?*

ANSWER—(a) Use permissible powders and make every effort to avoid shattering the coal by overcharging the hole in blasting. See that every shot is undermined and sidecut or both. In machine mining, load out all bug-dust and fine coal. Use dust-proof cars and avoid overloading them. Have all roads cleaned regularly.

(b) Make and enforce strict regulations in regard to cleaning up the roads and working places, sprinkling and spraying them at regular short intervals and adopting means to humidify the air throughout the mine. Employ shotfirers to examine, charge and fire all shots that in their judgment are safe.

The Weather Vane of Industry

News Notes Chronicling the Trend of Industrial Activities on Which Depends the Immediate and Future Market for Coal

THE real basis for confidence in the course of business in 1922 is now clear, according to a review of business conditions by *Commerce Monthly* for February. "Notwithstanding the severe depression during the past year," the review continues, "purchases by the American people in terms of physical volume were sufficient to absorb to a large extent accumulated stocks so that a gradual increase in output of many classes of manufactures may be expected. Future needs must be supplied primarily from current production. This means greater business activity and explains the expansion in manufactures which has taken place in recent weeks.

"The general tone of business during the first two weeks of January has been encouraging. The total physical volume of retail trade is good. Necessities are selling much better than are luxuries.

"Unemployment is unquestionably widespread, but probably its extent has been somewhat overestimated. Special measures undertaken to lessen it, particularly public works, are doing much to alleviate its worst features. The major part of the production energy of the country is absorbed in clothing, feeding and sheltering the population.

"Railroads have made notable gains in economy of operation, and improved credit conditions have definitely bettered their outlook, although traffic is at present disappointing in volume. The heavy decline in tonnage, serious as it has been, has primarily been the result of lessened shipments of coal, iron ore and similar heavy commodities. Reasonable buying of rails, cars, locomotives and other equipment may be expected during the current year.

"The year opens with promise of active building construction. Labor has not been liquidated and building costs therefore are still far above prewar levels, and are out of line with prices generally. This condition operates especially against building and construction for production of income, but not so heavily against individual enterprises for personal occupancy, or public buildings and public works. Consequently the field of residence building and public construction offers the greatest promise."

Freight Loadings Gain 114,885 Cars

Loadings of revenue freight during the week ended Jan. 14 totaled 720,877 cars, according to the American Railway Association. This was an increase of 114,885 cars over the week before, which was, however, a holiday week owing to the observance of New Year's day. The total was an increase of 5,022 cars over the corresponding week in 1921 but 119,647 cars less than the corresponding week in 1920. Coal loading showed an increase of 22.263 cars over the previous week, the total being 159,245 but this was 23,551 cars less than during the same week last year.

On Jan. 15 there were 593,298 freight cars idle, compared with 646,673 on Jan. 8, or a reduction within that time of 53,375 cars. Surplus coal cars amounted to 195,-284 or a reduction of 24,160 within the week.

D., L. & W. Shops Resume Work

Approximately three thousand men employed in shops at the Delaware, Lackawanna & Western Railroad Co. in Scranton, Kingston and East Buffalo, N. Y., have resumed work after being idle three weeks.

Smith & Wesson Plant Reopens

Employees of Smith & Wesson, pistol manufacturers, Springfield, Mass., returned to work Monday, Jan. 16, when a wage reduction of 20 per cent went into effect. The plant had been closed since last July owing to business conditions.

Better Times for Anthracite Region

The Pennsylvania State Employment Bureau, a division of the State Department of Labor and Industry, sees better days ahead for the anthracite coal industry. Its report for Jan. 15 shows 315,000 unemployed persons in the State. The report of the bureau on conditions in the Scranton district is as follows: "With the return to work of the striking miners at several collieries of the Lehigh Valley Coal Co. in Luzerne and Lackawanna counties industrial peace reigns once more throughout the district. This settlement affects approximately 12,000 men. The increased demand for domestic sizes of anthracite coal seems to indicate that a better day is at hand."

New Darco Plant for Texas

The Atlas Powder Co. has begun construction work on a new plant for the Darco Corporation at Marshall, Texas, according to an announcement by W. J. Webster, president of the company. The new plant is designed to have an annual capacity of 6,000 tons of Darco, a carbon for use in refining and purifying sugar, edible oils, lactose, maltose, gelatine, drugs and chemicals.

Obtains Big Powder Contract

The Du Pont Powder Co. announces that it has received a contract from the Argentina government for a million pounds of military smokeless powder. This contract will be filled at Carney's Point, N. J., and will keep the plant busy for about six months.

Hoover Sees Business Gain

Indications of improved business conditions throughout the country were declared Jan. 23 by Secretary Hoover to be evidenced in the increased orders for equipment being placed by the railroads. The railroads, Mr. Hoover said, report that their inventories of 1920 and during government control have been practically worked off and they must assume the purchasing of equipment. This, he declared, was a healthy sign from a manufacturing point of view.

The Illinois Central R.R has placed orders for 2,100 all steel freight cars. The Haskell-Barker Co. received 700, the American Car & Foundry Co. and the Standard Steel Car Co. 500 each, and the Western Steel Car & Foundry Co. 400. The Illinois Central Railroad also has placed orders for 2,000 gondola cars. The Seaboard Air Line greeted the new year with an order for 1,500 to 2,000 cars. Orders for additional freight cars are expected to be placed shortly by the Chicago, Burlington & Quincy for about 7,000 cars.

Senator Kenyon Classifies Coal as a Public Utility

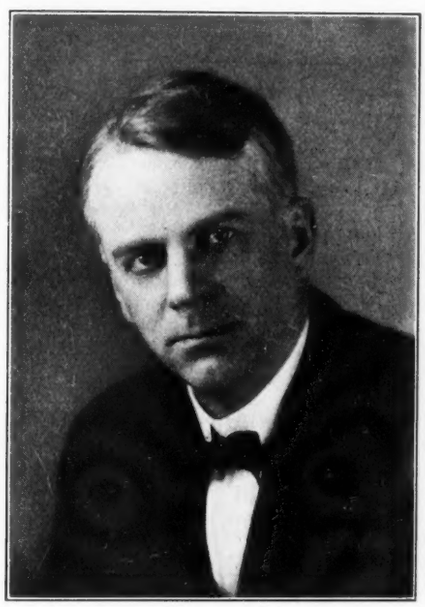
Makes Personal Report on West Virginia "War," Suggesting to Congress a National Industrial Code and a Federal Arbitration Board to Handle All Mine-Labor Controversies

COAL is a public utility and therefore its production and distribution should be conducted with the public's interest predominant. This is the conclusion upon which Senator William S. Kenyon, of Iowa, bases a striking report filed in the Senate on Friday, Jan. 27, in which he suggests an industrial code for the settlement of disputes in the mining industry and proposes that a federal board of three operators, three workmen and three representatives of the public adjudicate such disputes.

The report is an individual one made by the Senator following an investigation of the troublous West Virginia and Kentucky border region, where the "civil war" of 1920 and 1921 was fought over the issue of unionism. The investigation was made by a subcommittee of the Senate Committee on Education and Labor of which Senator Kenyon was chairman.

Incorporation of labor unions is urged in a minority report from the Labor Committee of the Senate. The report is signed by Senator Phipps, of Colorado; Senator Warren, of Wyoming, and Senator Sterling, of South Dakota. The practice of labor unions without legal responsibilities entering into contracts with operators who are bound by such agreements is un-American, the report states.

Senator Kenyon formulated his industrial code upon the basis of a "bill of rights" for both mine workers and employers, as shown on the next page. The complete industrial code which the Senator will give direction to whatever action Congress may take, follows:



SENATOR WILLIAM S. KENYON

1. Coal is a public utility and in its production and distribution the public interest is predominant.

2. Human standards should be the constraining influence in fixing the wages and working conditions of mine workers.

3. Capital prudently and honestly invested in the coal industry should have an adequate return sufficient to stimulate and accelerate the production of this essential commodity.

4. The right of operators and miners to organize is recognized and affirmed. This right shall not be denied, abridged, or interfered with in any manner whatsoever, nor shall coercive measures of any kind be used by employers or employees, or by their agents or representatives, to compel or to induce employers or employees to exercise or to refrain from exercising this right.

5. The right of operators and of miners to bargain collectively through representatives of their own choosing is recognized and affirmed.

6. The miners who are not members of a union have the right to work without being harassed by fellow workmen who may belong to unions. The men who belong to a union have the right to work without being harassed by operators who do not believe in unionism. The organizations have a right to go into non-union fields and by peaceable methods try to persuade men to join the unions, but they have no right to try and induce employees to violate contracts which they have entered into with their employers, and the operators on the other hand have the right by peaceable means to try to persuade men to refrain from joining the unions.

7. The right of all unskilled or common laborers to earn an adequate living wage sufficient to maintain the worker and his family in health and reasonable comfort, and to afford an opportunity for savings against unemployment, old age, and other contingencies is hereby declared and affirmed. Above this basic wage for unskilled workers, differentials in rates of pay for other mine workers shall be established for skill, experience, hazard of employment, and productive efficiency.

8. The right of women to engage in industrial occupations is recognized and affirmed; their rates of pay shall be the same as those of male workers for the same or equivalent service performed; they shall be accorded all the rights and guarantees granted to male workers and the conditions of their employment shall surround them with every safeguard of their health and strength and guarantee them the full measure of protection which is the debt of society to mothers and to potential mothers. Few women are engaged in any way in mining, but it may be as well to announce this proposition as to pass it by.

9. Children under the age of 16 years shall not be employed in the industry unless permits have been issued under state authority.

10. Six days shall be the standard work week in the industry with one day's rest in seven. The standard work day shall not consist of more than eight hours a day.

11. Punitive overtime shall be paid for hours worked each day in excess of the standard workday.

12. When a dispute or controversy arises between operators and mine workers, there should be no strike or lockout, pending a conference or a hearing and determination of the facts and principles involved.

Senator Kenyon's report covers 25 printed pages, the main part being devoted to argument for amicable settlement of industrial disputes. He reviews the issues between the operators and the unions in the controversy in which he defends the positions taken by each side, and condemns likewise unlawful practices alleged to have been performed by both. Neither operator nor union is spared from criticism.

"There is little use in reviewing the evidence or of entering into an elaborate discussion of the causes of the present industrial controversy in West Virginia," he says. "The issue is plain. The operators will not employ men belonging to the unions, as they believe they will become agitators. On the other hand the United Mine Workers of America are determined to unionize these fields, which are practically the only large and important coal fields in the United States not unionized. Thus we have a situation of two determined bodies trying to enforce what they believe are rights, which rights are diametrically opposed to one another—an irresistible force meeting an immovable body. In such case there can be nothing but trouble."

After stating the claims of the operators and unions as presented to the committee, the Senator adds:

"There have been violations of law on both sides of this controversy. There has been an arrogance upon both sides, seeming to indicate that, in the opinions of some of the leaders, the question was entirely one between the operators and the workers. Both sides have been forgetful of the great third party—the public—which has a vital interest in preserving industrial peace, especially in a region furnishing the percentage of coal that this region furnishes.

"If this matter is none of Congress's business, as is intimated in some of the briefs, then this committee should not have been appointed, but the intimation is merely a confirmation of the arrogance of those who assume that the public has no interest whatsoever in these matters. If it is no business of the National Government, then federal troops should not have been requested to preserve peace.

"A few particular things in the evidence perhaps should be referred to. A great deal is said in argument as to the change in the constitution of the United Mine Workers and substitution of the words relative to the mine workers of the 'full social value of their product,' sold and consumed,

EMPLOYERS' RIGHTS

As Proposed in Senator Kenyon's Industrial Code

They have a right to operate their plants on a non-union basis or on a union basis. They have the right to employ men whether those men belong to a union or not. They have the right to discharge men because they belong to a union or to discharge them because they do not belong to a union. They have the right not to employ men if they do not desire to do so.

They have no right to use force and violence to keep men out of a county who are there for the purpose of inducing men to join the union.

They have the right to protect their property. The fundamental of protection, however, should be upon the state. It is the duty of the state to protect the properties of the operators if anyone attempts to use force and violence against them. There is no right in public policy or public morals for the operators to pay the salaries of deputy sheriffs. The state police power and private police power cannot work together. The state cannot abdicate its function of protecting the public.

MINERS' RIGHTS

Under Senator Kenyon's Proposed Industrial Code

1. Men have the right to organize peaceably in trade unions and to bargain collectively through their chosen representatives. The exercise of their right to organize does not include coercive measures of any kind to induce persons to join their unions, nor to induce employers to bargain or deal therewith, nor to intimidate or harass non-union men associated with them.

2. While the right to strike now exists there is no right by violence or threats or interference to keep other men from taking the places of the strikers. They may peaceably dissuade men from taking their places.

3. Men who are not members of the union have a right to work without being harassed by fellow workmen who may belong to unions. Men who belong to unions have a right to work without being harassed by operators who do not believe in unionism. The miners have a right to go into non-union fields and by peaceable methods to try to persuade men to join the union, but they have no right to try to induce employees to violate contracts.

in place of the words 'equitable share of the value of their product.' If this means, as is claimed by the operators, that the miners are claiming 'full social value' of the coal produced, leaving no compensation for property, of course, the same is indefensible and entirely un-American.

"It is rather unfortunate for the United Mine Workers that they adopted such a provision, which cannot receive the sanction of thoughtful men and women, and the explanation thereof has not been satisfactory."

The Senator thinks it is amazing that anyone would seek to defend the astounding situation of deputy sheriffs who are paid by operators performing general duties of deputy sheriffs and not merely defending the property of their employers.

He refrains from discussing the check-off system as questions involved therein are pending in the courts.

The Senator refers to the claim of the operators that the union intends to obtain a monopoly of the production of coal and to be in a position April 1 to stop industry and freeze people into acceding to their demands.

Referring to federal troops being sent into the region, to stop the famous march of the miners on Logan and Mingo counties, Senator Kenyon characterizes the march as "an indefensible performance." He says the whole story is one of disregard for and breaking of laws; of denials of constitutional rights; of a spirit of suspicion, hate and retaliation on both sides that does not augur well for industrial peace, and that there must be some change of feeling and some mutual concessions before peace will be re-established. He believes there must be some remedy under which the rights of both parties will be protected, and also those of the people, which are paramount.

"It is abhorrent to think that industrial troubles can only be settled by force, riot and bloodshed; that no basis can be established for adjustment of these difficulties," he adds. "Will not employers recognize the right of labor to a larger participation in the wealth which it creates? Will unionized labor not recognize the right of men to earn a living even though they do not belong to the unions?"

He believes a solution can be worked out along the lines of the President's message to Congress in December which will apply to disputes in basic industries. He denies that the President had in mind the proposed Kansas Industrial Court law.

The Senator says certain restrictions upon personal liberty, however regrettable in theory, must be imposed in practice in order that greater damage may not be done to the body politic.

He says the Kansas Industrial Court law cannot be a success because it had no underlying code of rules or principles which are regulatory or mandatory upon the court, and parties coming before it can invoke no bill of rights. He says the court is based upon a violation of previous experience, in this country and abroad, arising from legislation prohibiting strikes, and that it aims to solve a problem in human adjustments with an arbitrary, rigid and unrestricted judicial fiat. On the other hand the tribunal he advocates is based on a code of principles sanctioned by industrial usage.

He favors limiting the proposed industrial code to the mining industry in an effort to compose difficulties with equal and exact justice to capital, labor and the public, and that production may be stabilized and stimulated.

Senator Kenyon reviews the various futile efforts that have been made in this country during the past two years to project a new industrial code to be used as a basis for the settlement of industrial disputes. The Transportation Act of early 1920 enumerated seven principles for such a code and the Railroad Labor Board enunciated sixteen additional ones. Thus by action of Congress, supplemented by the Railroad Labor Board, a code of twenty-three fundamentals was laid down to govern in determining wages, working conditions and industrial relations for railroads. The Senator says this is exactly what Congress should do now for the coal industry.

He then discusses the legal aspects of the right of an employer to employ or discharge employees, quoting the decision of the Supreme Court in the Hitchman Coal & Coke Co. case. He says in this case the holding apparently is that the employer has a constitutional right to employ men who belong to a union but that there is a fair inference that this right may be modified by a proper exercise of the paramount police power.

This right, he believes, can be restricted by positive act of Congress, depending upon whether the public welfare required the principle of collective bargaining to be conceded to the workers as a legal right.

He refers to conflicting opinions in this regard, one group claiming that collective bargaining can be carried out only through the employees of the particular industry, and that the employees are not entitled to have agents representing them who are not members of the working force of the particular establishment. After quoting the operators and the President on the right of labor to organize he says "there is apparently some conflict between the two."

The Senator claims no originality or sanctity for his views, as they may be faulty, but he believes they offer some solution for the difficulties. He contends that Congress is economically impotent if it cannot devise some plan to bring about a better situation in industrial life. He has no pride of opinion in his views and would be glad to accept any other plan that might seem better. He will later introduce a bill covering the propositions laid down.

THE INDUSTRIAL MEDIUM now most needed is one that can make ghosts walk.—*Norfolk Virginian-Pilot.*

THE REASON BUSINESS CONDITIONS are unsettled is because so many accounts are.—*Elizabeth Journal.*

Most Industries Favor Lowering Coal Freights First, Also Urging Relatively Heavier Cuts

BY PAUL WOOTON
Washington Correspondent of *Coal Age*

SINCE nearly every witness appearing before the Interstate Commerce Commission at the hearing on the proposed reduction of railroad freight rates is being asked what commodities should be favored in the matter of rate reduction, it is believed that the commission has in mind the application of different amounts of reductions even among basic commodities. This view is strengthened by the way in which testimony was developed to show that the relative increase in coal rates was much greater than in iron-ore rates.

In the majority of cases the witnesses would include coal among the commodities which should have the greatest reduction. Many witnesses have expressed the belief that coal should be favored to a greater extent than their own commodities. Nearly all the representatives of the iron and steel industry and associated activities expressed the opinion that it is more important to have a reduction in the rate on coal than on steel products. Other industries which ask that coal be included among the commodities favored are cement, roofing, asphalt, brick, building tile, paving brick, lime and glass. Even witnesses for the construction industry testified that building is being interfered with because of the high cost of coal. One of the lumber witnesses said coal should be favored before lumber. Most witnesses have suggested the removal of the 1920 increases.

During the past week it has become increasingly evident that the commission is determined to know where it is going before it authorizes any reduction. It is apparent that the members will take no chances and are not going to undertake an experiment with the rate structure. They are insisting on facts, and their questions indicate that reductions will be calculated carefully before they are made.

EXTENSION OF RAILROADS MUST BE CONSIDERED

The commission seems to have been impressed particularly by the point made by George H. Cushing that railroad extension must be considered when a new rate level is in contemplation. The fact that there was a net reduction in railroad mileage last year and that in a normal year the railroads are taxed to their utmost to furnish passable service seems to have deeply impressed the commission. Since Mr. Cushing brought up the question several witnesses have referred to the future adequacy of railroads and have stressed the fact that inefficient transportation is the last thing they want. Members of the commission have asked nearly every witness: "Would you prefer lower rates to assurance of service?" Some have replied that service is relatively more important than the freight rate but most of those testifying have indicated that they will take chances on the service if the rate is reduced.

While the commission, in announcing the hearing, stated that no consideration was to be given differentials, it is evident that they must come in for some consideration. It was pointed out by a witness for the byproduct coke industry that they are more interested in differentials than in a lower rate, as under the present rates byproduct coke is penalized heavily, he said, in favor of beehive coke. Apparently the commission is considering coal and coke as a single commodity, with the probabilities favoring the same treatment for coke as for coal.

That the coal producers were wise in presenting a solid front—by having their case presented by a single witness—has been demonstrated amply as the case of other commodities has been presented. In addition to losing the advantages that go with a single clear-cut presentation, the divergence of views presented by different witnesses has had the effect of weakening the presentation of several commodities.

The further evidence that the commission is going to be doubly sure before taking action tends to the belief that it may be later than April 1 before a decision can be handed down. Practically all those in attendance are agreed that the opinion cannot be rendered before April 1.

It is known that some of the witnesses who will appear for the public will oppose vigorously any horizontal reduction in rates. Arguments will be made for a scientific readjustment, and it is not improbable that a plea will be made for higher rates on certain first-class commodities with the idea of making possible greater reductions in the rates on low-grade freight.

The commission has revised the schedule to some extent. The testimony of the public and shippers as to the general aspects of the case is to be completed Feb. 4. Other assignments are as follows: Vegetable oil and soap, Feb. 8; grain, flour and agricultural products, Feb. 9; railway labor organizations, Feb. 10 and 11; canned goods and wholesale groceries, Feb. 15; fruits and vegetables, Feb. 16 and 17; milk, cream and dairy products, Feb. 18; beverages and beverage containers, waste materials, Feb. 20; live-stock and packing-house products, Feb. 21 and 22; petroleum and petroleum products, Feb. 23 and 24; other commodities, Feb. 25.

Central Pa. Bituminous Coal Output Falls To 9.60 Per Cent of U. S. Total

PRODUCTION of bituminous coal in central Pennsylvania during 1921, according to tabulations by the Central Pennsylvania Coal Producers' Association, dropped to 9.60 per cent of the total produced in the United States, the percentage having been much higher in prevous years. Output by months in thousands of net tons was as follows:

Month	1917	1918	1919	1920	1921	United States 1921	Per Cent from Central Pa. 1921
Jan.	5,104	4,637	5,115	4,562	3,865	39,840	09.70
Feb.	4,351	4,666	3,148	3,763	3,238	30,794	10.52
Mar.	5,261	5,318	3,482	5,196	3,274	29,839	10.97
Apr.	4,497	5,084	3,405	4,429	2,775	28,410	09.77
May	4,841	5,215	3,650	4,287	3,185	34,316	09.28
June	5,344	5,393	3,831	4,621	3,283	32,509	10.10
July	4,851	5,590	4,387	4,891	2,947	30,842	09.56
Aug.	5,139	5,702	4,832	5,161	3,255	34,241	09.51
Sept.	4,717	5,104	4,865	5,347	3,196	35,014	09.13
Oct.	5,311	5,266	5,581	5,331	3,893	43,921	08.86
Nov.	5,175	4,138	1,205	5,170	3,220	35,895	08.87
Dec.	4,367	4,402	3,045	5,414	2,935	31,369	09.36
Total	58,658	60,515	46,546	58,172	39,066	406,990	09.60
Per Cent of U.S. Production	10.63	10.44	10.16	10.39	9.60		

U. S. Will Encourage Legitimate Trade Associations, Daugherty Says

IT is probable that the Department of Justice will not issue a formal statement defining the scope of activities which may be followed by trade associations under the decision of the Supreme Court in the Hardwood lumber case. Attorney General Daugherty says that while the Department of Justice desires to give to business the most accurate information regarding trade associations, the department adheres to the court's decision, which he regards as far-reaching, emphatic and clear. Associations doing a legitimate service for business will be encouraged but the department will not make concessions to organizations which would tend to weaken or abandon the rule laid down by the court in the lumber case.

COAL AGE INDEX

The indexes to Coal Age are furnished free to all who ask for them. The index for the last half of 1921 will soon be ready for distribution. A copy can be had by addressing a postcard to the subscription department of Coal Age.

Bill to Create Coal Commission Introduced In New York Legislature

ASSEMBLYMAN Thomas F. Cosgrove, of Richmond County, Greater New York, introduced in the Legislature at Albany Jan. 26 a measure to regulate the coal and wood industries in the State of New York. While the measure is aimed especially at the distribution of coal and the prices charged therefor, it covers the production, transportation, manufacture, storage, distribution and sale of coal and coal products and wood.

A commission of five members is provided for in the bill, to consist of the Commissioner of Health and four others to be appointed by the Governor, to serve without pay, but to receive their traveling expenses, also their office expenses. Coal is to be regulated as a health measure.

A voluminous system of reporting to the commission is provided. The coal producer reports to the commission the names and addresses of distributors who buy from him, together with the quantities and price; then the distributor has to tell to what dealers he sold it; after that the dealer tells to what individuals he sold it and how much he got for it; the consumer does not have to report.

After that the commission issues an order. If all five commissioners agree on the order, it becomes mandatory and anyone having the temerity to disobey it is liable to $500 fine or imprisonment for one year, or both. If only four out of five commissioners agree on an order, the order is simply filed and it becomes a recommendation.

The measure itself bears all the earmarks of a milk commission bill introduced in the New York Legislature last year. The members of the commission are to be kept honest by not allowing them to hold political office while they serve as such or for one year after surrendering their jobs.

McDougall Shows Why Nova Scotia Scale Should Be Lowered Considerably

THE Board of Conciliation appointed to investigate the wage dispute between the British Empire Steel Corporaand the coal miners in its employ, now sitting at Halifax, N. S., gave a hearing to vice-president D. H. McDougall of the corporation Jan. 20. He declared that business could not be carried on at the recent rate of wages and that the wage proposed was the highest that could be paid if competition and the general demand for lower prices was to be met. He reviewed at length the coal situation in the United States and the general deflation in wages and prices, stating that the coal sales of the corporation had steadily declined month by month, owing to the heavy importation of coal from the United States at prices with which his company could not compete because of the high cost of production in the Nova Scotia mines.

In summarizing the corporation's position Mr. McDougall said that the cost of production since 1914 had increased 224 per cent, that the earnings of the miners had increased by not less than 140 per cent; yet the increase in the cost of living at the coal mines was not more than 50 per cent. The company's prices for coal were 30 per cent less than those of 1921. The ability of the companies to pay wages depended on their ability to sell coal, which without a reduction of wages of approximately 35 per cent could not be mined and sold without loss at the prices now prevailing and likely to prevail in 1922.

Name Committee to Settle Demurrage Bills Of Old Tidewater Coal Exchange

IN order to clear up, if possible, the confusion which has arisen in connection with the demurrage bills rendered by the railroads and computed by the old Tidewater Coal Exchange for the months of January to April, 1919, inclusive, a committee composed of W. A. Marshall, John Crichton and Harry J. Hughes has been appointed. Shippers have been unable to reconcile the bills with their records and correspondence with the various railroads seems to have added to the confusion rather than point to a solution. To effect an adjustment of the matter the committee suggests that it will be necessary to organize a force of accountants, in charge of someone who is thoroughly familiar with this demurrage matter, to meet the expense of which a contribution based upon 5 per cent of the demurrage bills rendered by the railroads is to be sent to the committee. Checks should be made payable to W. A. Marshall, chairman, 25 Beaver St., New York City.

Extent of Shutdown of Bituminous Mines In 1919 Strike Shown by Survey

PERCENTAGES of capacity of bituminous mines closed down on account of the strike of union miners in 1919, taken from the weekly reports of production and running time furnished by operators of about 3,000 mines to the Geological Survey, are shown in the accompanying table. The percentage used represents the average condition for an entire week, but for a selected week—the one in which the strike reached a maximum in the particular district. In many fields the strike was 100 per cent effective from Nov. 1 to the middle of December. In some other districts the men were out for only a week or two. In still others there was a gradual drift back to work extending over several weeks. Furthermore, the week of maximum stoppage did not come in all fields at the same time. For these reasons the shutdown was never quite as complete as shown in the table, though almost as complete during the first week of the strike.

The Survey, of course, has no data as to the number of union miners, but its official records of production during the strike of 1919 shows how each district responded to the strike call. Since 1919, of course, there have been changes in the extent of the union organization. The anthracite region, also, is organized.

STRENGTH OF MINERS' UNION IN 1919 STRIKE

District	Maximum per cent of district capacity closed during 1919 strike	District production in 1918 (Net Tons)	Apparent maximum annual output of union fields (Net Tons)
Central Pennsylvania			
Section A (P. R. R. and connections)	67	*a*25,000,000	16,750,000
Section B (N. Y. C. and connections)	99	*a*16,000,000	15,840,000
Section C (B. R. & P. and other roads)	91	*a*20,629,000	18,772,000
Northern Pennsylvania	100	8,051,000	8,051,000
Pittsburgh, Pa.	100	48,299,000	48,299,000
West Virginia Panhandle	61	3,255,000	1,986,000
Westmoreland, Latrobe, Greensburg and Ligonier	5	17,701,000	885,000
Connellsville	0	35,677,000	0
Somerset	6	7,194,000	432,000
Cumberland-Piedmont	98	7,073,000	6,932,000
Fairmont, W. Va.	*e*90	20,104,000	18,094,000
Northern Ohio	100	30,287,000	30,287,000
Michigan	100	1,465,000	1,465,000
Southern Ohio	100	15,768,000	15,768,000
Northeastern Kentucky	70	7,109,000	4,976,000
Hazard, Ky.	0	2,364,000	1,173,000
Kanawha	88	*b*13,324,000	11,725,000
Kenova-Thacker	0	7,024,000	0
Logan	0	10,307,000	0
New River	98	9,292,000	9,106,000
Winding Gulf	0	5,156,000	0
Pocahontas and Tug River	0	23,128,000	0
Southwestern Virginia	8	9,041,000	723,000
Southern Appalachian	100	*c*11,712,000	11,712,000
Harlan	*d*60	*d*3,202,000	1,925,000
Alabama and Georgia	48	19,252,000	9,241,000
Western Kentucky	58	10,833,000	6,283,000
Indiana	100	30,679,000	30,679,000
Illinois	100	89,291,000	89,291,000
Iowa	100	8,192,000	8,192,000
Missouri	99	5,668,000	5,611,000
Kansas	99	7,562,000	7,486,000
Arkansas	100	2,227,600	2,227,000
Oklahoma	100	4,813,000	4,813,000
Texas	*e*50	2,261,000	1,131,000
North Dakota	*e*30	720,000	216,000
Montana	*e*90	4,533,000	4,079,000
Colorado	55	12,408,000	6,824,000
Utah	0	5,137,000	0
New Mexico	15	4,023,000	603,000
Washington	100	4,082,000	4,082,000
Wyoming	*e*95	9,438,000	8,966,000
Total	71.6	579,281,000	414,625,000

(*a*) Apportionment of total production for central Pennsylvania between Sections A, B, and C partly estimated. (*b*) Includes all high-Volatile mines in southern West Virginia not included in the New River, Logan and Kenova-Thacker districts. (*c*) Includes Tennessee and southeastern Kentucky outside of Harlan County. (*d*) Of the tonnage of Harlan County Operators' Association 81 per cent was closed, but the Lynch mines continued to operate. (*e*) Partly estimated.

Southern Ohio and Pittsburgh Coal Producers Post Reduced Wage Scales Effective April 1

RARELY indeed do union operators state in advance their demands for a wage reduction. They usually let the union do the initial proposing. Southern Ohio Coal operators on Saturday, Jan. 28, followed the action taken by the Pittsburgh Coal Producers' Association on Jan. 26 in putting precedent to one side. Both associations have declared that after April 1, when their present contracts come to an end, they will not collect the "check-off" and will pay a reduced scale of wages.

Acting on their own initiative, the southern Ohio producers formulated a scale which provides for reductions from the present scale of from 30 to 47 per cent and elimination of the check-off. It was announced Saturday, Jan. 28. The scale will be submitted to the miners with the request that it be accepted by March 1, to become effective April 1, when the present wage agreement expires. The new pick-mining scale is 77c. per ton, as compared with the present scale of $1.11; machine mining is to be paid at the rate of 60c. a ton, as against 94c. at present; the reduction in day wages is from $7.50 to $4 and in some cases $3.75 per day.

The operators point out that the new scale is considerably higher than that prevailing in 1916 and in formulating it due consideration was given to present economic conditions, wages paid in other industries, the reduction in the cost of living and mining scales now being paid in other districts, especially the non-union districts of West Virginia.

Lee Hall, president of the Ohio organization of United Mine Workers, said nothing could be done with the scale until after the international convention, Feb. 14.

The Pittsburgh Coal Producers Association announced its new scale after a meeting held Thursday, Jan. 26. The scale, which provides for heavy reductions in wages, effective April 1, is as follows:

PITTSBURGH COAL PRODUCERS ASSOCIATION SCALE

Per ton of 2,000 lb., run-of-mine:	
Pick mining, thin-vein	$0.77
Pick mining, thick-vein	0.68
Cutting, thin-vein	0.10
Loading, thin-vein	0.50
Cutting, thick-vein	0.075
Loading, thick-vein	0.465
Yardage and deadwork 30 per cent below 1921 scale.	
Per eight-hour day:	
Motormen	4.60
Motormen helpers, skilled wiremen, tracklayers, bottom cagers, drivers, trip drivers, water and machine haulers, timbermen (where employed)	4.50
Wiremen helpers, tracklayer helpers	4.25
Pipemen for compressed-air plants and all other inside labor except trappers	4.00
Dumpers and ram operators	4.00
Trimmers	3.50
Pushers, car cleaners and all other outside labor	3.25
Trappers	2.00

About sixty companies, some of them extremely large, are included in the Pittsburgh Coal Producers Association. The association says that the new scale provides wages 36 to 40 per cent higher than pre-wartime wages. It provides a higher wage, comparatively speaking, than the reduced wages for some time effective in other industries.

Quoting the declarations of the president of the United Mine Workers at Shamokin, of which the following is one: "The bituminous coal miners expect not only what they have gained but will demand an increase in their basic wage rates," the association declares: "The operators believe that these statements of a determined policy demonstrate the futility of any meeting with the United Mine Workers of America."

Wage Demands Would Add $1.30 Per Ton To Anthracite Price, Operators Assert

COMPLIANCE with the demands of the anthracite mine workers for a 20-per cent increase in contract rates and $1 a day increase for all day men would mean an advance of at least $1.30 a ton in the mine price of domestic sizes of hard coal, according to a statement issued Jan. 24 by the General Committee of Anthracite Operators.

The statement, which also declares that the cost of production would be increased 78.4c. a ton, is the first to be issued by the operators since the United Mine Workers adopted their new wage demands at their tri-district convention at Shamokin, Pa., Jan. 17-21. No comment is made on the decision of the men to strike on April 1, if a satisfactory agreement cannot be reached with the employers by that date, when the present contract expires.

The operators have appointed a wage scale committee, headed by S. D. Warriner, president of the Lehigh Coal & Navigation Co., Philadelphia, Pa., to meet with the wage scale committee of the miners as soon as such a conference is authorized by the union. The demands of the anthracite miners must first be approved at the international convention of the union at Indianapolis, Ind., on Feb. 14, before any conferences with the operators can be held.

No definite rejection of the union's demand is expected until the joint conference is held, and then the negotiations will be taken up by subcommittees, which probably will meet in New York.

"Wage demands of 20 per cent increase in contract rates and $1 a day increase for all day men," said the operators' statement, "made by the tri-district convention of the United Mine Workers of America in Shamokin last week, if granted would mean an increase of at least $1.30 a ton on the mine price of domestic sizes of anthracite—grate, egg, stove and nut—which the consumer would pay.

"Other demands, like that for time and half time for overtime and double time for Sundays and holidays, would also increase labor costs and correspondingly increase prices.

"Using the labor cost of the first six months of 1921 ($3.92 per gross ton) as a basis, the increase in labor cost if the wage demands were granted would be 78.4c. a ton on the total production. Applied to the prepared sizes, or 60 per cent of the production, it works out to $1.30, as given above."

West Virginia Mine Chiefs Are Bailed Out

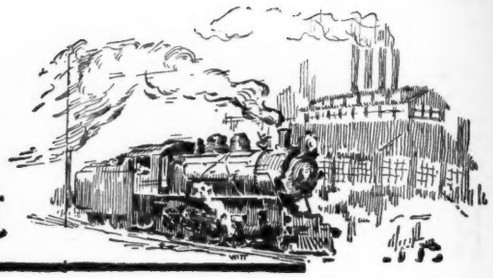
ON Jan. 18 Keeney and Mooney were released from the Logan County jail on $15,000 bail. Blizzard also was bailed, but on $20,000 bail. Bail was refused to the eight men who are directly accused of taking part in the death of John Gore, a Logan County deputy sheriff, killed in the fighting at Blair Mountain. Bail was furnished by several other defendants during the same day. Judge Bland, on petition of counsel for the United Mine Workers, changed the venue for the trial to Jefferson County.

Frank Snyder, editor of the *West Virginia Federationist*, a radical labor paper, and Isaac Scott, acting secretary-treasurer of the district union, have been arrested on a charge of treason and conspiracy.

THE FEDERATED AMERICAN ENGINEERING SOCIETIES has appointed a new committee on registration of engineers. The personnel of the committee is as follows: A. S. Dwight (chairman), New York; Gardiner S. Williams, Ann Arbor, and Philip N. Moore, St. Louis. A new federal water-power committee also has been named. John H. Finney, of Washington, is the chairman of the committee. Other members are Calvert Townley, New York; G. S. Williams, Ann Arbor; Gano Dunn, New York, and A. P. Davis, Washington.

CONGRESS WOULD ACCOMPLISH more with fewer "blocs" and more tackle.—*Columbia Record.*

Production and the Market



Weekly Review

DEVELOPMENTS last week in the impending wage controversy in the coal industry were of major importance. In the Pittsburgh district operators announced their proposed scale—based on a rate nearly identical with the scale of April 16, 1917—77c. for thin vein coal and 68c. for thick vein. Southern Ohio producers adopted a new scale providing for a cut ranging 31 to 46⅔ per cent. Abolition of the check-off is embodied in both of the above announcements. Union officials in each district have intimated that acceptance of a lower wage scale was impossible.

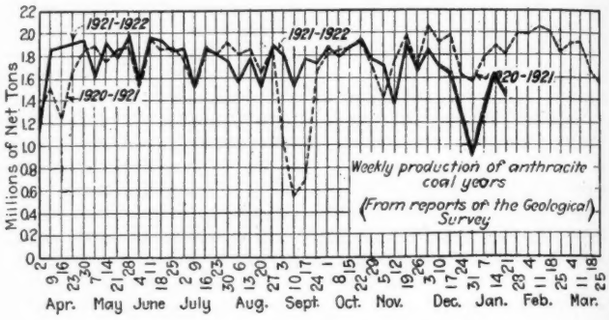
The forerunners of new agreements having been thus summarily disapproved by the miners, a coal strike becomes more of a certainty. The first reflection of a prospective tie-up has been witnessed by the appearance of inquiries for storage coal for delivery prior to April 1. Industrial stocks must be safeguarded in anticipation of trouble, but the uncertain future is a deterring influence to buyers and coal men alike.

Narrow Price Range Forecasts Higher Quotations

Consumers desire protection, but not "over-protection," being reminded of the probability of lower mine costs and transportation charges in the next coal year. Sellers hesitate to commit themselves to anything but a current delivery basis at the prevailing prices. So the net result is a better spot market from a production standpoint and a narrowing price range, forecasting slightly higher quotations, which to date, however, have not put in an appearance.

The spot market is stimulated by a better domestic call as winter temperatures continue. This in turn has relieved the scarcity of fine coals and lower steam quotations have offset the improvement in prepared coal prices.

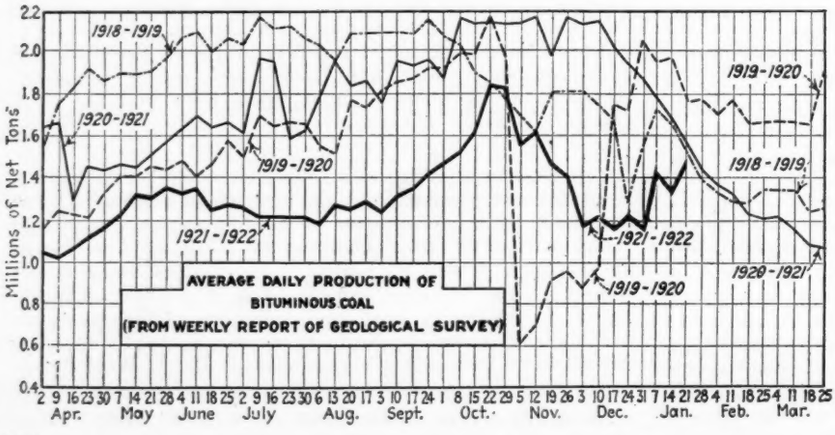
The true gage of the future—industrial activity—is more encouraging. Gains are being made in the iron and steel industry, and railroads, automobile plants, building operations, etc., are inquiring for new material and equipment. Another healthy sign for better business is the gain in movement of revenue freight reported by the railroads. The woolen industry is more active. January saw many conflicting drifts in trade, but favorable factors predominated.


1921-1922
1921-1922
1920-1921
1920-1921
Millions of Net Tons
Weekly production of anthracite coal years
(From reports of the Geological Survey)
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar.

The feature of the anthracite market is the strength of the steam grades. An actual shortage is near, as the curtailed production of late has made the supply inadequate. This is due not so much to increased commercial demand as to the necessarily steady consumption of steam coals by the collieries. With winter weather prevailing, family sizes are, of course, in much better position. While retailers have enjoyed better trade, they have not placed orders in proportion to their outgo and it is evident that many intend to greet April wage readjustments with stockpiles reduced to the minimum.

BITUMINOUS

Production increased 6.4 per cent during the week ended Jan. 21, according to the Geological Survey. The total output was 8,838,000 net tons, as compared with 8,304,000 in the week previous. At present the tonnage mined is slightly



Estimates of Production
(Net Tons)

BITUMINOUS COAL

Week Ended:	1921–1922	1920–1921
Jan. 7 (*b*)	7,476,000	9,633,000
Jan. 14 (*b*)	8,304,000	10,763,000
Jan. 21 (*a*)	8,838,000	9,936,000
Daily average	1,473,000	1,656,000
Coal year	331,171,000	449,879,000
Daily aver. coal year	1,338,000	1,809,000

ANTHRACITE

	1922	1921
Jan. 7	1,242,000	1,597,000
Jan. 14	1,643,000	1,895,000
Jan. 21 (*a*)	1,443,000	1,819,000

COKE

Jan. 14 (*b*)	119,000	266,000
Jan. 21 (*a*)	116,000	258,000
Calendar year	344,000	794,000

(*a*) Subject to revision. (*b*) Revised from last report

ahead of consumption, so that some coal is going to storage, although weekly production is still 2,000,000 tons short of the high point reached last October, when the railroad strike threat induced buying. Loadings on the first two days of last week indicated a further increase in production.

New England movement all-rail increased perceptibly during the week ended Jan. 21, 1922, when 2,970 cars were reported through the gateways, as compared with 2,233 the previous week. This tonnage is mainly made up of railroad fuel and orders on old contracts, as the all-rail territory has been greatly reduced by the inroads of water-borne coals. The New England market has reacted slightly to strike talk. Stocks are still heavy and while industrial demands are only increasing slowly, caution is prompting buyers to safeguard their supply in anticipation of trouble. Coastwise freights have advanced with the better inquiries, although recent bad weather has also been a feature.

COAL AGE INDEX BITUMINOUS COAL PRICES, 1922

	Average Spot Price	Index
Jan. 2	$2.325	192
Jan. 9	2.290	189
Jan. 16	2.294	190
Jan. 23	2.219	183
Jan. 30	2.207	182

AVERAGE SPOT PRICES OF BITUMINOUS COAL, F.O.B. MINES
(Unit net ton of 2,000 lbs.)

Month	1913	1914	1915	1916	1917	1918	1919	1920	1921
Jan.	$1.46	$1.21	$1.13	$1.53	$4.15	$2.48	$2.57	$2.57	$3.26
Feb.	1.22	1.16	1.12	1.40	4.18	2.53	2.49	2.58	2.77
March	1.17	1.17	1.09	1.27	3.89	2.58	2.47	2.58	2.63
April	1.17	1.16	1.08	1.24	3.21	2.64	2.43	3.85	2.62
May	1.15	1.16	1.07	1.21	4.14	2.67	2.38	4.59	2.68
June	1.14	1.12	1.07	1.26	4.00	2.57	2.40	7.18	2.52
July	1.18	1.12	1.05	1.22	3.17	2.58	2.47	8.24	2.40
August	1.22	1.13	1.07	1.30	3.24	2.58	2.76	9.51	2.42
Sept.	1.23	1.11	1.10	1.57	2.02	2.58	2.91	8.52	2.37
Oct.	1.29	1.13	1.12	2.26	2.02	2.58	3.09	7.78	2.33
Nov.	1.31	1.10	1.17	3.87	2.48	2.58	2.57	5.87	2.35
Dec.	1.26	1.11	1.33	4.01	2.48	2.58	2.58	4.38	2.26
1st Quarter	1.28	1.18	1.11	1.40	4.07	2.53	2.51	2.58	2.89
2nd Quarter	1.15	1.15	1.07	1.24	3.78	2.63	2.40	5.20	2.61
3rd Quarter	1.21	1.12	1.07	1.36	2.81	2.58	2.71	8.76	2.40
4th Quarter	1.29	1.11	1.21	3.38	2.33	2.58	2.74	6.01	2.31
Yearly average	1.23	1.14	1.12	1.85	3.25	2.58	2.59	5.64	2.55

RELATIVE PRICES OF BITUMINOUS COAL, SPOT PRICES JULY, 1913—JUNE, 1914, AS BASE

	1913	1914	1915	1916	1917	1918	1919	1920	1921
Jan.	120	100	93	126	343	205	213	212	270
Feb.	101	96	92	116	346	209	206	213	229
March	97	96	90	105	321	214	204	213	217
April	97	96	89	103	265	218	200	318	217
May	95	96	89	100	342	221	197	379	222
June	95	93	88	104	331	212	198	593	208
July	97	93	87	101	262	213	204	681	198
August	100	93	88	107	268	213	228	786	200
Sept.	102	92	91	130	167	213	241	704	196
Oct.	106	93	93	187	167	213	256	643	193
Nov.	108	91	97	320	205	213	212	485	194
Dec.	104	92	100	332	205	213	213	362	187
1st Quarter	106	97	92	116	337	209	208	213	239
2nd Quarter	96	95	89	102	313	217	198	430	216
3rd Quarter	100	93	89	113	232	213	224	723	198
4th Quarter	106	92	97	280	192	213	227	497	191
Yearly average	102	94	91	152	269	213	214	466	211

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F. O. B. Mines

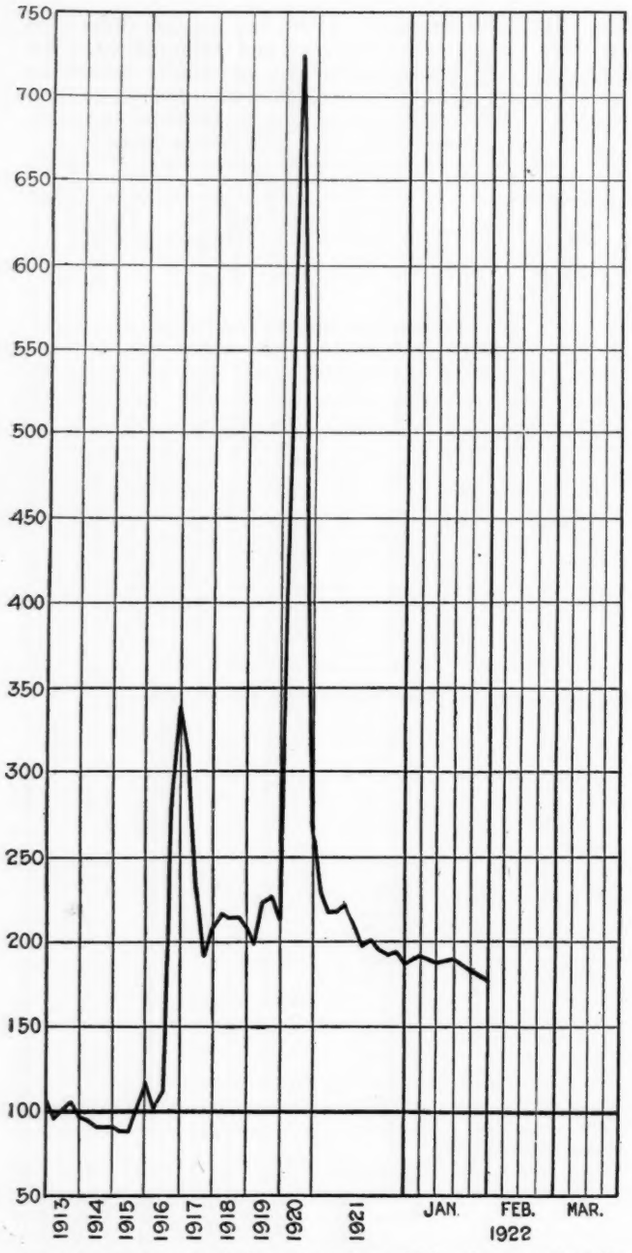
Low-Volatile, Eastern	Market Quoted	Jan. 2, 1922	Jan. 16, 1922	Jan. 23, 1922	Jan. 30, 1922†
Pocahontas lump	Columbus	$3.55	$3.45	$3.30	$3.15@$3.50
Pocahontas mine run	Columbus	2.15	2.15	2.15	2.00@ 2.25
Pocahontas screenings	Columbus	1.65	1.50	1.50	**1.45@ 1.65**
Pocahontas lump	Chicago	3.10	3.10	2.85	2.50@ 3.25
Pocahontas mine run	Chicago	2.50	2.50	2.15	1.85@ 2.50
Pocahontas lump	Cincinnati	3.25	3.00	2.85	**3.00@ 3.25**
Pocahontas mine run	Cincinnati	2.05	1.90	1.90	**1.85@ 2.25**
Pocahontas screenings	Cincinnati	1.55	1.30	1.40	1.25@ 1.50
*Smokeless mine run	Boston	4.70	4.80	4.70	4.65@ 4.80
Clearfield mine run	Boston	2.05	2.05	1.95	1.65@ 2.25
Cambria mine run	Boston	2.50	2.45	2.45	**2.25@ 2.70**
Somerset mine run	Boston	1.80	1.80	1.80	**1.75@ 2.00**
Pool 1 (Navy Standard)	New York	3.15	3.00	3.20	*2.75@ 3.00*
Pool 1 (Navy Standard)	Philadelphia	3.00	3.00	3.00	2.75@ 3.25
Pool 1 (Navy Standard)	Baltimore	2.40	2.30	2.40	**2.65@ 2.75**
Pool 9 (Super. Low Vol.)	New York	2.35	2.25	2.25	*2.10@ 2.35*
Pool 9 (Super. Low Vol.)	Philadelphia	2.30	2.30	2.30	**2.25@ 2.50**
Pool 9 (Super. Low Vol.)	Baltimore	2.20	2.15	2.10	**2.35@ 2.50**
Pool 10 (H. Gr. Low Vol.)	New York	2.10	1.95	2.10	*1.85@ 2.25*
Pool 10 (H. Gr. Low Vol.)	Philadelphia	2.00	2.00	2.00	1.90@ 2.10
Pool 10 (H. Gr. Low Vol.)	Baltimore	2.00	1.90	1.95	**1.95@ 2.15**
Pool 11 (Low Vol.)	New York	1.65	1.70	1.70	*1.55@ 1.80*
Pool 11 (Low Vol.)	Philadelphia	1.70	1.70	1.70	1.60@ 1.80
Pool 11 (Low Vol.)	Baltimore	1.75	1.80	1.70	**1.90@ 2.00**
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.50	1.45	1.45	*1.30@ 1.50*
Pool 54-64 (Gas and St.)	Philadelphia	1.55	1.55	1.50	1.40@ 1.60
Pool 54-64 (Gas and St.)	Baltimore	1.45	1.40	1.40	**1.50@ 1.75**
Pittsburgh Sc'd. gas	Pittsburgh	2.65	2.65	2.65	2.60@ 2.70
Pittsburgh mine run (St.)	Pittsburgh	2.15	2.15	2.15	2.10@ 2.20
Pittsburgh slack (Gas)	Pittsburgh	1.80	1.80	1.75	1.70@ 1.80
Kanawha lump	Columbus	2.80	2.95	2.60	*2.40@ 2.65*
Kanawha mine run	Columbus	1.85	1.80	1.65	1.50@ 1.85
Kanawha screenings	Columbus	1.40	1.50	1.15	1.10@ 1.25
Kanawha lump	Cincinnati	2.75	2.50	2.50	*2.25@ 2.65*
Kanawha mine run	Cincinnati	1.45	1.40	1.40	*1.25@ 1.50*
Kanawha screenings	Cincinnati	1.25	1.00	1.10	*0.90@ 1.25*
Hocking lump	Columbus	3.00	2.85	2.60	*2.40@ 2.65*
Hocking mine run	Columbus	1.90	1.85	1.90	1.75@ 2.00
Hocking screenings	Columbus	$1.40	$1.50	$1.20	**$1.20@$1.35**
Pitts. No. 8 lump	Cleveland	3.05	3.50	3.00	**2.75@ 3.35**
Pitts. No. 8 mine run	Cleveland	2.00	2.10	1.90	**1.85@ 2.10**
Pitts. No. 8 screenings	Cleveland	1.95	1.95	1.65	*1.50@ 1.60*
Midwest					
Franklin, Ill. lump	Chicago	3.80	3.50	3.65	3.25@ 4.05
Franklin, Ill. mine run	Chicago	2.90	2.80	2.35	2.25@ 2.50
Franklin, Ill. screenings	Chicago	2.10	2.00	2.05	*1.60@ 2.25*
Central, Ill. lump	Chicago	3.10	3.10	3.00	2.75@ 3.25
Central, Ill. mine run	Chicago	2.50	2.50	2.35	2.25@ 2.50
Central, Ill. screenings	Chicago	1.90	1.80	1.70	*1.40@ 1.65*
Ind. 4th Vein lump	Chicago	3.35	3.35	3.25	3.00@ 3.50
Ind. 4th Vein mine run	Chicago	2.55	2.55	2.55	*2.35@ 2.50*
Ind. 4th Vein screenings	Chicago	2.10	2.10	1.85	*1.50@ 1.75*
Ind. 5th Vein lump	Chicago	2.95	2.95	2.95	2.60@ 3.25
Ind. 5th Vein mine run	Chicago	2.25	2.25	2.20	2.00@ 2.40
Ind. 5th Vein screenings	Chicago	1.80	1.65	1.65	*1.25@ 1.65*
Standard lump	St. Louis	2.60	2.75	2.75	**2.75@ 3.00**
Standard mine run	St. Louis	1.85	1.90	1.95	**1.90@ 2.10**
Standard screenings	St. Louis	1.65	1.35	1.35	*0.90@ 1.10*
West. Ky. lump	Louisville	2.85	2.75	2.55	**2.50@ 2.75**
West. Ky. mine run	Louisville	1.90	1.75	1.80	**1.60@ 2.25**
West Ky. screenings	Louisville	1.65	1.25	1.05	*0.70@ 1.25*
South and Southwest					
Big Seam lump	Birmingham	3.35	2.75	2.75	**2.75@ 3.00**
Big Seam mine run	Birmingham	2.10	2.10	2.10	*1.75@ 2.00*
Big Seam (washed)	Birmingham	2.15	2.15	2.15	*2.00@ 2.25*
S. E. Ky. lump	Louisville	2.85	2.85	2.70	**2.50@ 3.00**
S. E. Ky. mine run	Louisville	1.60	1.55	1.55	1.50@ 1.65
S. E. Ky. screenings	Louisville	1.30	1.25	1.25	*1.00@ 1.25*
S. E. Ky. lump	Cincinnati	3.00	2.55	2.65	**2.50@ 3.00**
S. E. Ky. mine run	Cincinnati	1.50	1.35	1.45	1.35@ 1.50
S. E. Ky. screenings	Cincinnati	1.20	1.10	1.05	*0.75@ 1.15*
Kansas lump	Kansas City	5.00	5.00	4.75	**5.00**
Kansas mine run	Kansas City	4.10	4.10	4.00	4.00
Kansas screenings	Kansas City	2.50	2.50	2.50	2.50

*Gross tons, f.o.b. vessel, Hampton Roads.
†Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F. O. B. Mines

	Market Quoted	Freight Rates	Jan. 16, 1922 Independent	Jan. 16, 1922 Company	Jan. 23, 1922 Independent	Jan. 23, 1922 Company	Jan. 30, 1922† Independent	Jan. 30, 1922† Company
Broken	New York	$2.61	.....	$7.60@$7.75	.....	$7.60@$7.75	.....	$7.60@$7.75
Broken	Philadelphia	2.66	$6.75@$7.50	7.75@ 7.85	$6.75@$7.50	7.75@ 7.85	**$7.00@$7.50**	7.75@ 7.85
Egg	New York	2.61	7.00@ 7.35	7.60@ 7.75	7.00@ 7.75	7.60@ 7.75	**7.25@ 7.75**	7.60@ 7.75
Egg	Philadelphia	2.66	7.00@ 7.75	7.75	7.00@ 7.75	7.75	**7.15@ 7.75**	7.75
Egg	Chicago	5.63	7.40*	6.95*	7.40*	6.95*	**7.50***	6.95*
Stove	New York	2.61	7.85@ 8.10	7.90@ 8.10	7.75@ 8.10	7.90@ 8.10	**7.85@ 8.10**	7.90@ 8.10
Stove	Philadelphia	2.66	8.00@ 8.15	8.05@ 8.25	7.75@ 8.15	8.05@ 8.25	7.75@ 8.15	8.05@ 8.25
Stove	Chicago	5.63	7.60*	7.20*	7.60*	7.20*	**7.75***	7.20*
Chestnut	New York	2.61	7.85@ 8.00	7.90@ 8.10	7.50@ 8.10	7.90@ 8.10	**7.85@ 8.10**	7.90@ 8.10
Chestnut	Philadelphia	2.66	8.00@ 8.15	8.05@ 8.25	7.75@ 8.15	8.05@ 8.25	7.75@ 8.15	8.05@ 8.25
Chestnut	Chicago	5.63	7.60*	7.20*	7.60*	7.20*	**7.75***	7.20*
Pea	New York	2.47	4.25@ 4.75	6.05@ 6.45	4.75@ 5.50	6.05@ 6.45	4.75@ 5.50	6.05@ 6.45
Pea	Philadelphia	2.38	4.50@ 5.00	6.15@ 6.25	4.50@ 5.00	6.15@ 6.25	**4.75@ 5.00**	6.15@ 6.25
Pea	Chicago	5.63	6.10*	5.60*	6.10*	5.60*	6.10*	5.60*
Buckwheat No. 1	New York	2.47	2.25@ 3.00	3.50	2.75@ 3.25	3.50	**2.85@ 3.50**	3.50
Buckwheat No. 1	Philadelphia	2.38	2.25@ 2.75	3.50	2.75@ 3.00	3.50	**2.75@ 3.25**	3.50
Rice	New York	2.47	1.90@ 2.25	2.50	2.00@ 2.25	2.50	**2.00@ 2.50**	2.50
Rice	Philadelphia	2.38	1.75@ 2.00	2.50	1.75@ 2.00	2.50	**2.00@ 2.25**	2.50
Barley	New York	2.47	1.35@ 1.60	1.50	1.35@ 1.50	1.50	**1.35@ 1.75**	1.50
Barley	Philadelphia	2.38	1.00@ 1.25	1.50	1.00@ 1.25	1.50	**1.25@ 1.50**	1.50
Birdseye	New York	2.47	.....	2.50	.....	2.50	.....	2.50

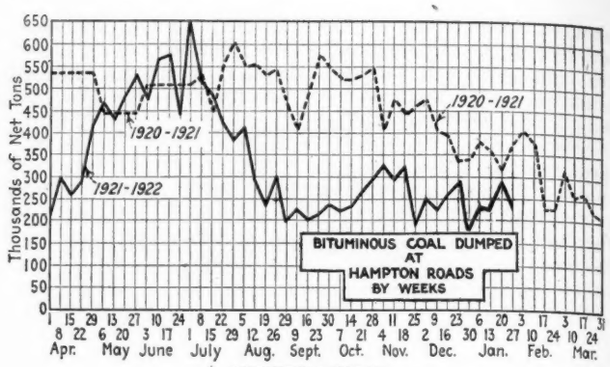
*Net tons, f.o.b. mines. †Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index of relative spot prices of bituminous coal at the mines, 182, week of Jan. 30, 1922. This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the total output of the United States, weighted in accordance first with respect to the proportions each of slack, prepared and run-of-mine normally shipped and, second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913-1918," published by the Geological Survey and the War Industries Board. The result is a series of index numbers, plotted in the above diagram and shown in the table on the preceding page.

Northwestern docks are busily engaged in filling rush domestic orders brought by the colder weather. The steam coals are still sluggish. The Midwest is better able to absorb the heavy shipments of Eastern prepared coals that have been flooding that market this season. This has kept Illinois and Indiana producers from securing much additional business on the better domestic market, although they have been able to dispose of their heavy "no-bills." A week ago yards were clogged with domestic loads for which there were no orders.

The severe weather reduced Hampton Roads dumpings to 235,807 tons during the week ended Jan. 26, 1922, a decline of 30,000 tons from the previous week. The export market is inactive, with the exception of a few cargoes to the West Indies.



ANTHRACITE

Production dropped to 1,443,000 net tons during the week ended Jan. 21, a decline of 200,000 tons from the week preceding. With the better, however, more collieries are resuming and the slump is thought to be only temporary. Orders to the mines have not kept pace with retail distribution, as retailers are endeavoring to reduce their present supplies before April 1. The steam sizes are in greatly improved position and independent prices are at the level of company schedules and in some instances slightly higher.

COKE

Wage developments indicate coming strength in Connellsville coal which will be reflected in the coke market. At present the industry is very quiet; first-quarter contracts apparently are all covered and spot demand is exceedingly light. Production in the Connellsville region shows a slight decline.

Shipping Board Asks $4,637,372 for Coal; Erects Oil Station Near Coal Mine

ESTIMATES submitted to Congress by the Shipping Board request $4,637,372 for coal for the year beginning July 1 next. A. G. Frey, vice-president of the board, in charge of operations, explained the activities of the fuel department of the board in testimony before the House Appropriations Committee. The fuel department covers the purchase of coal, construction and operation of bunkering stations and economies in fuel consumption, in addition to fuel-oil needs of the shipping board steamers.

An arrangement has been perfected whereby the fuel section arranges to approve the quantities of fuel to be on board each vessel when she sails from every port in her itinerary, and when any ship fails to follow the most economical bunker schedule an investigation is held, the responsibility is determined and action taken with respect to the negligent or incompetent engineers. The board also has inaugurated a rigid and thorough supervision of bunkering operations to see that vessels are dispatched promptly, take proper quantities and avoid overbunkering or underbunkering at any port. Vessels in the transatlantic and Gulf service bunker at Norfolk instead of Charleston, saving time and expense.

Testimony was given to the effect that former officials of the board had contracted for the erection for $660,000 of a fuel-oil station at Durban, on the east coast of South Africa, which was protested by the Vacuum Oil Co., the contractor, which called attention to the fact that within a few miles of the proposed oil station was one of the largest coal mines in the world, turning out the finest quality of coal at a much lower price.

While the board had favorable oil contracts it was testified that the board "was stuck on coal," receiving supplies under contracts made last March.

Counsel Schlesinger said the coal and oil contracts of the board had given "endless trouble," explaining that with the falling off of boats in operation the board had no storage space for coal to be delivered under the contracts. Its relations with contractors had become acute and while negotiations for relief of the situation were under way there probably would be litigation over the contracts.

Foreign Market And Export News

British Output Gains Despite Trade Uncertainty; Wage Cuts May Cause Strike at French Mines

British coal production continues to improve steadily in spite of uncertain trade conditions responsible for the 14 days' shutdown of the Sundown Colliery, in Dover. The total output of Great Britain for the week ended Jan. 14 was 4,720,000 gross tons, according to a cable to *Coal Age*. This was an increase of 1,045,000 tons over the previous week. The output a month ago, however, ran close to 5,000,000 tons.

More and more frequent are mine shutdowns in Wales. Operators are constantly finding it more difficult to find buyers at home or on the Continent. The only noticeable demands are from India and the Far East.

Some of the members of the Coal Mining Association are discussing a co-operative scheme for the reconstruction of the British coal fields.

French Miners Suffer Two Wage Cuts

French coal operators in the Pas de Calais and the Nord startled the miners of those regions by deciding last month upon two wage cuts. The first, of 2 fr. 50c., takes effect at once, and the second, of the same size, will become effective in April. The new scale was adopted by the operators while negotiations over wages were going on between masters and men. The union leaders had declared the miners of France would strike if wages were cut.

The operators insist they are not asking the men to make all the sacrifices. They claim that reduction in dividends also will contribute to reduce the cost of producing coal so that the strenuous English competition can be met. More labor saving machinery is to be introduced, they say, in a further effort to hammer down prices.

Each of the two wage cuts, they state will result in a drop of five francs per ton in the price of French coal.

Storms Slow Hampton Roads Activity

Dumpings declined approximately 25,000 tons during the week ended Jan. 26. Weather conditions seriously impeded the physical features of coal dumping. Coal was frozen at all piers, requiring a triple operation to dump cars.

Several cargoes dispatched coastwise to the North were reported held up near their destination on account of ice, and a number of cargoes ready for shipment by barge to New England were delayed here on account of the weather in the Northern ports.

A combine of schooners for the coastwise coal trade is about to be consummated here according to reports in shipping circles. Several schooner masters have arranged to charter five vessels, and, in conjunction with a local coal firm, to engage in developing a New England business. The plans have not yet been completed.

Export Clearances, Week Ended, Jan. 26, 1922

FROM HAMPTON ROADS

	Tons
For Atlantic Islands:	
Am. S. S. Agwistar, for Fort de France	6,579
FOR CUBA	
Br. S. S. Berwindvale, for Havana	7,852
Nor. S. S. Gro for Havana	3,513
Am. S. S. Levisa, for Preston	2,393
Am. S. S. Glyndon, for Sagua de Tanamo	725
FROM PHILADELPHIA	
For Brazil:	
Br. S. S. Coartoun, for Rio de Janeiro	2,714
For Cuba:	
Am. Schr. Josiah B. Chase, for Cienfuegos*	2,500

*Including coke.

Coal Paragraphs from Foreign Lands

GERMANY—Production in the Ruhr region during the week ended Jan. 14 was 1,885,000 metric tons, according to a cable to *Coal Age*, as compared with 1,543,000 tons in the week preceding.

ITALY—Cardiff steam first is quoted on the Genoa market at 37s. 3d., according to a cable to *Coal Age*. This is a decline of 3d. from last quotations.

BELGIUM — The coal market shows considerable improvement. Consignments of industrial coal are becoming more numerous and domestic descriptions are still in great demand. The coke market is firmer. During the present year new Limbourg coal fields will be put into operation.

INDIA—The Bombay coal market is steady. Stocks are adequate. The rates are: Bengal first, 35 rupees; English coal, 38 rupees.

Pier and Bunker Prices, Gross Tons

Foreign Bunker Quotations by Cable to Coal Age

	Jan. 21	Jan. 28†
PIERS		
Pool 9 New York	$5.45@$5.65	$5.45@$5.65
Pool 10, New York	5.20@ 5.30	*5.15@ 5.30*
Pool 9, Philadelphia	5.50	5.50
Pool 10, Philadelphia	5.10@ 5.30	5.10@ 5.30
Pool 71, Philadelphia	5.50@ 5.60	5.50@ 5.60
Pool 1, Hamp. Rds	4.65@ 4.80	4.65@ 4.80
Pools 5-6-7 Hamp. Rds	4.25	**4.25@ 4.40**
Pool 2, Hamp. Rds	4.45	**4.50**
BUNKERS		
Pool 9, New York	5.80@ 5.95	5.80@ 5.95
Pool 10, New York	5.50@ 5.60	*5.45@ 5.60*
Pool 9, Philadelphia	5.60@ 5.85	5.60@ 5.85
Pool 10, Philadelphia	5.40@ 5.50	5.40@ 5.50
Pool 1, Hamp. Rds	4.80@ 4.90	4.80@ 4.90
Pool 2, Hamp. Rds	4.60	**4.65**
Welsh, Gibraltar	38s. f.o.b.	38s. f.o.b.
Welsh, Rio de Janeiro	55s. f.o.b.	55s. f.o.b.
Welsh, Lisbon	40s. f.o.b.	40s. f.o.b.
Welsh, La Plata	50s. f.o.b.	50s. f.o.b.
Welsh, Marseilles	120 fr. f.o.b.	120 fr. f.o.b.
Welsh, Genoa	40s. t.i.b.	40s. t.i.b.
Welsh, Madeira	40s. f.a.s.	40s. f.a.s.
Welsh, Teneriffe	40s. f.a.s.	40s. f.a.s.
Welsh, Malta	40s. f.o.b.	40s. f.o.b.
Welsh, Las Palmas	40s. f.a.s.	40s. f.a.s.
Port Said	49s. f.o.b.	49s. f.o.b.
Belgian, Antwerp	30s.	30s.
Alexandria	46s.	46s.
Bombay	38 rupees	38 rupees
Capetown	42s.	42s.

Current Quotations British Coal f.o.b. Port, Gross Tons

Cardiff:	Jan. 21	Jan. 28†
Admiralty, Large	24s. 9d.	24s. 6d.@25s.
Steam, Smalls	18s. 3d.	*17s.6d@18s.6d.*
Newcastle:		
Best Steams	**21s.**	**25s.**
Best Gas	21s.	**21s.@22s.**
Best Bunkers	20s. 9d.	**21s.**

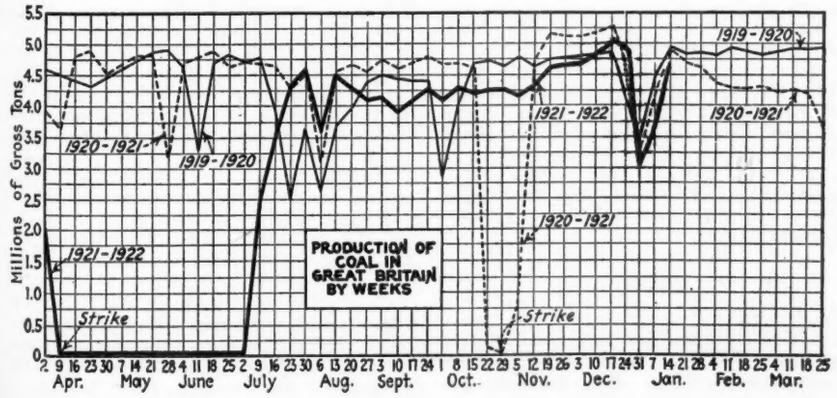
† **Advances over previous week shown in heavy type declines in *italics*.**

Hampton Roads Pier Situation

	Week Ended Jan. 19	Week Ended Jan. 26
N. & W. Piers, Lamberts Point:		
Cars on hand	1,498	1,788
Tons on hand	86,814	99,519
Tons dumped	122,469	119,968
Tonnage waiting	4,450	15,400
Virginian Ry. Piers, Sewalls Point:		
Cars on hand	830	1,276
Tons on hand	49,300	77,000
Tons dumped	73,771	44,568
Tonnage waiting	4,150	22,787
C. & O. Piers, Newport News:		
Cars on hand	824	1,119
Tons on hand	41,200	55,950
Tons dumped	41,830	46,006
Tonnage waiting	7,500	....

United States December Exports of Coal and Coke, by Customs Districts

Customs Districts:	Anthracite (Gross Tons)	Bituminous (Gross Tons)	Coke (Gross Tons)
Maine & N. H.	6	.....	.....
Vermont	1,163	662	243
Massachusetts	161	.....	.....
St. Lawrence	108,573	135,613	769
Rochester	6,377	23,762	.....
Buffalo	176,046	204,926	6,023
New York	5,225	119	332
Philadelphia	3,131	16,939	1,604
Maryland	.....	26,264	3,156
Virginia	.....	95,451	.....
South Carolina	.....	80,173	.....
Florida	.....	.....	58
New Orleans	.....	484	506
San Antonio	461	308	2,131
El Paso	2	5,599	932
San Diego	7	16	.....
Arizona	1,729	232	.....
San Francisco	.....	478	9
Washington	67	1,367	.....
Dakota	2,133	3,720	1,408
Duluth & Superior	902	5,483	136
Michigan	288	87,738	5,256
Ohio	2	152,758	471
Total	306,277	770,092	23,03



ANTHRACITE

Looks Like Old Times In Hard Coal Market

Cold and Strike Threat Start Actual Rush of Business—Retailers Slow to Restock—Steam Coals Fairly Active These Days

Cold weather and uneasiness over the present mine wage controversy have brought rush times to Eastern and New England anthracite retailers. Retail replenishment of stocks is not keeping pace with domestic distribution of coal, however, and April 1 will probably see many retail yards in low supply. Steam coals are more active.

PHILADELPHIA

The lowest temperature of the winter has enabled the dealers to move a large amount of coal. They expect good business for some weeks to come.

Wholesale prices on stove and nut hold quite close to company quotations of $8.10. Much independent egg has been offered at $7.60. Pea is extremely dull at $4.25 for washery grade although $5 still remains a general price for good coals.

The retail prices have grown weaker. The large majority of dealers insist on $11 for pea but a growing number shade off to $10.50. The standard price for stove and nut is still $14.25, with some dealers offering at $13.75.

Dealers' stocks are gradually running down, and they seem greatly satisfied with this. Their ordering is light. They all have their eyes on April 1 and the feeling seems to grow that it would be the best policy to have light stocks on hand then. They now argue further that if they were heavily stocked and both coal and freight were reduced, they would suffer extremely heavy losses.

The steam trade continues to improve, so much so that some companies have picked up storage coal to fill buckwheat orders. As in other markets, demand for rice and barley has been greatly increased. There is an actual shortage, caused not so much by heavier takings, as by continued reduced production and the fact that colliery consumption of the small coals is always out of proportion to the tonnage mined during curtailed operations.

NEW YORK

Demand suddenly picked up last week and wholesale offices reported better business than for some weeks back. While there was increased activity for domestic coals the greatest call seemed to be for the steam sizes.

Retailers reported consumers nervous. Early in the week many inquiries regarding the outcome of the miners' demands were received and these were followed in many instances by heavy orders. In some cases where the tonnages required were large, buyers were cautioned against uneasiness.

Some independents were able to get slightly higher prices than company circular, but these were exceptional. The companies were able to move their coal freely. There was some cheap washery coal offered here during the week.

Buckwheat was plentiful and moved easily, the better grades of independent coals bringing full company prices. Rice was not so free while the better grades of barley were scarce and in some instances were reported as being quoted 25c. above company circular, although the average was only 10c.@ 15c. above.

ANTHRACITE FIELDS

Some small operations which ran only four or five days during December are now working about four days a week. As against this, however, the Spring Brook Coal Co., at Pond Creek, has closed down indefinitely.

Some of the larger companies are only working three days a week. The Pennsylvania Coal Co. is working the northern half of its colliery the first three days and the southern half the last three days of each week. The Truesdale operation of the Glen Alden Coal Co. has been shut down for a couple of days.

In the middle field one company has announced a cut of 25c. in domestic coal prices and 10c. a ton on pea in order that business might be stimulated. The mines of the Panther Creek Valley are not working full time. Another large company operating over 30 mines in the lower field closed for two days last week.

BUFFALO

Demand is unsteady. Shippers are much puzzled to know why consumers, who formerly bought a winter's supply all at one time early in the season, now put in a load at a time. Shippers say that the actual consumption of anthracite this season will not come up to the average, though they have no reason to give for the falling off.

There is some improvement in the supply of natural gas and that may be accountable for part of the falling off in the use of coal. Lately the gas company has obtained a supply from local byproduct ovens.

All reports from the mines agree that both schedule and independent mines are running at a very slow pace. Some are shut down for want of demand and others find it impossible to sell at a profit, as there is no regular premium paid and in some cases the sales are at prices below schedule at independent mines.

BOSTON

All the companies have had better business the past week, especially on stove and chestnut. Egg and pea are still in poor demand, but the aggregate tonnage in February of all sizes is certain to show up favorably, as compared with January. Better prices being realized by independent shippers is an index of a better trade condition, and now that many retailers have worked off some of their reserves there will be a tendency to replace.

There is a growing certainty that April 1 will probably see a suspension, at least of a few weeks. In any case, buyers are keeping their ears close to the ground, while retail demand has much improved. The extreme cold of the past week has been a factor, but there has also been a proportion of buyers who feel that it is just as well to be forehanded over coal supply.

BALTIMORE

Cold weather for ten days or so past and the big snow storm sent many users of anthracite scurrying for coal. All the dealers were kept busy before the snow came and since the fall have had their hands full with a difficult delivery problem. The majority of yards here have fairly good stocks on hand.

CHICAGO

The demand for anthracite remains sluggish or worse, and one of the larger independents circularized a price list from $1.50 to 75c. a ton off previous quotations. This action speaks as well as anything for the condition of the anthracite market.

South

BIRMINGHAM

Demand is comparatively light, as consumers continue the policy of buying only in quantity sufficient for immediate needs. Resumption along commercial and industrial lines in the direction which would increase coal consumption is slow and unimportant so far in the new year. The Atlanta, Birmingham & Atlantic R.R., which did not provide for an adequate coal supply by contract last year has contracted for about 5,000 tons per month additional for the next twelve months.

Domestic coal is still difficult to dispose of, as dealers have not experienced sufficient relief on their stocks to enter the market for replenishment. Quotations are somewhat unstable: Carbon Hill mine run, $1.75@$2, washed, $2@ $2.25, lump, $3@$3.25; Cahaba mine run, $2.25@$2.50. washed, $2.25@$2.50, lump, $3.75@$4.50; Black Creek mine run, $2.25@$2.50. washed, $2.25@$3, lump, $3.75@$4.50; Corona mine run, $1.90@$2, washed, $2@$2.25, lump, $3; Pratt mine run, $1.75@$2.

Production for the week ended Jan. 14 ran around 230,000 net tons, which was some better than the weeks preceding the holidays. The larger part of this came from mines operated by furnace companies and either went into coke production for their own use or was used as steam fuel at their operations. Commercial and domestic mines are only averaging about two days per week as a whole.

NORTH ATLANTIC

New Schedule of Wages Makes Strike Likelier

Southern Ohio and Pittsburgh Owners Are Positive In Their Tone—Production Grows Slowly—Interest Is Keener Daily

Precautionary buying measures throughout north Atlantic markets occasioned by the strike talk are indicated in the increasing requests for quotations over a period of 60 days. A more healthy demand is also resulting from lowered reserves in consumers' yards. The situation is too unsettled to consider contracting at this time, and the tightening market is one that offers little inducement to operators to tie up their tonnage for the next 60 days.

NEW YORK

There is a better demand and more inquiries are being received. While many consumers believe there is going to be trouble in April with possibly several weeks suspension there are others who laugh at the idea, believing that if the union members quit work the non-union mines will be able to furnish all the coal needed.

Inquiries for the most part have to do with the prospects of shipments in February and as to what might be expected in the way of prices during that month and March. While some consumers have asked about contracts for the new coal year most operators are refraining from quoting because of the uncertainty of labor conditions.

Although demand picked up quotations differ little from last week. On Jan. 27 there were reported at the local docks about 1,400 cars which was a slight increase over the average for several weeks and of which about 30 per cent, it was estimated, was consigned to public utilities.

Southern coals were being offered here on a basis of around $4.60 at the southern ports.

PHILADELPHIA

Bituminous trade here remains at a standstill. Cold weather has had but little effect on the market. Consumers feel that even if there is a strike, non-union mines will stave off a coal famine during its duration. That section of the trade which regularly buys on contract is assured by shippers that non-union coal can be counted on. At the same time, the labor reports emanating from Washington have caused a slight upturn in orders and requests for quotations for the balance of the old coal year.

It is among the mines with union agreements that the greatest feeling exists on the strike question, and these interests have lost so much money already on this account that they want to see the question of wage readjustments definitely settled.

Business at Tide continues light, and even concerns accustomed to ship to Northern ports are handicapped by low-cost competition from Tide shippers in Southern fields.

BALTIMORE

Baltimore, in the grasp of the after effects of the heaviest snowstorm for several years, finds itself with no great reserve of bituminous. Most of the industries here have traveled light as to reserves, and the line supply is certainly poor. At the piers the practical suspension of export movement led at first to an accumulation which was later cleared up by degrees, while practically no new movement reached those points, and the Tide reserve is light. Inquiries a few days ago indicated that the impending strike is on buyer's minds.

The export and coastal delivery movement out of Baltimore since Jan. 1 has been very poor.

Last year Baltimore sent out on coastwise account to New England a total of 520,000 tons; on export a total of 1,646,000; bunker, 509,000; inside capes, 992,000 tons and on other tonnage 17,000, making a grand total of 4,136,000 handled over the piers at this point.

UPPER POTOMAC

Pending adjustment of wages there is no improvement in the district nor is any possible so long as the high cost of production prevents the general run of producers from taking advantage of what few orders might otherwise be obtained.

Not more more than ten per cent of the mines, if that many, are in operation. A few companies are getting out contract coal but even that type of business is rare.

CENTRAL PENNSYLVANIA

Production figures show that continued improvement is taking place. Operators are experiencing better business than for many months. Up to and including Jan. 19, shipments amounted to 34,141 cars, as compared with 32,904 cars in the corresponding period of December.

A number of mines have increased their forces. The possibility of a tie-up at the end of the contract period is a factor in the increased production.

Operators are unable to close contracts for next year's business and will not be able to do so until some wage agreement is reached. Prices are holding firm and Pool 1 is quoted $2.85@$3; Pool 9, $2.20@$2.30; Pool 10, $1.85@$2.10; Pool 11, $1.65@$1.75.

There has been no move for a conference between miners and operators in this field and there will not likely be such a move until after the Indianapolis convention of the U. M. W. on Feb. 14.

FAIRMONT

Inquiries appear to be a little more plentiful but orders are as scare as ever, except for a slightly increased demand for prepared. Prices on lump are practically unchanged. Mine run is hard to move.

Owing to the fact that there is no certainty as to what future labor costs will be, contracting for the new coal year is out of the question. Unconsigned loads, however, are diminishing.

NORTHWEST

Cold Weather Business Rushes Northern Docks

Bituminous Prices Drop and Retail Stocks Move Swiftly—But Large Carry-Overs Are Inevitable—This May Be Lucky For Buyers

Northwestern docks are experiencing a rush of cold weather business. Bituminous prices have been advanced. Retail stocks move quickly but reordering is purely a weather proposition. Even with the better business now prevailing docks are certain to have a large carry-over this spring. The value of this carry-over will, of course, be determined by the length of the impending strike. Should the tie-up be a protracted affair, this tonnage will be a welcome reserve from which to draw supplies; but an early settlement with lower costs inevitable, spells a heavy loss for dock operators.

MINNEAPOLIS

There has been a reasonable amount of rather severe weather lately. Despite this, the coal business has not responded with activity. But things are probably a little better than they seem in that there has been fairly steady consumption, and that means almost no surplus stock in the yards of retailers.

The wholesaler has no very promising outlook. Stocks on the docks have been fairly large, while buying has not been allowed to extend beyond urgent needs. But the repeated cold days must register in increased use of fuel for domestic and other heating plants. There is one difference to be noted from former days, in that consumers now wait until they are about out of coal before they order more, and the order placed is for a small lot.

The local papers have had scare-head stories of the certainty of the coal strike in the spring. But spring seems a long way off to coal buyers, who are not at all alarmed even if a strike is sure for April 1.

Neither are members of the coal trade in the Northwest at all distressed over the prospect for a suspension of mining at that time. They can see no other way in which the stocks of coal on the docks can be marketed at a price based upon their costs—if even that will permit this to be done. For there is a feeling that the net result will be lower coal costs for next season, when the matter is threshed out. And the demand in this section after the middle of March—is not large enough to materially affect stocks for some time thereafter.

There may be a little more interest on the part of railroads. But they are covered by contract as to price, and the coal is available to them, regardless of the probable strike. Some public service consumers may become interested, but they have usually been forehanded and have a contract to protect them in such an event. Even with a strike, there does not seem to be much hope for any great outlet for dock coal for some weeks after the strike starts.

DULUTH

Marked improvement is evident. All docks are working full-time. Conditions are still far from normal but dock men are more than optimistic.

Together with the resumption of trade has come an increase in prices of 50c. all around in bituminous. Lump is quoted at $6.50, with run of pile at $6. Screenings are firm at $4. Pocahontas is $9 for lump, but the market is weak, because of several docks being willing to make concessions.

A revision has also been made in hard coal prices. The grades stand as follows: Egg, $12.50; stove, $12.80; nut, $12.75; pea $10.80, buckwheat, $6. This is the usual seasonal revision, and is remarkable only in that stove commands a premium over nut. Heavy stocks of the latter are on the docks.

MILWAUKEE

Sub-zero weather throughout the territory supplied by Milwaukee has stimulated the coal market to a greater point of activity than has been experienced thus far the present season. The demand runs heavily to anthracite and the domestic grades of soft coal, and the urgency of the orders show that stocks in bins everywhere are far short of what they should be at this time of the year. As was predicted, the cold snap has congested delivery and shipping systems so that it is difficult to serve many as fast as they desire.

Prices are held firmly all around for coal and coke. Yard men are not worrying about the big stocks that remain on the docks, as they anticipate the need of coal next spring to bridge over the period of idleness that will result from the miners' strike which seems inevitable.

CINCINNATI GATEWAY

Coal Streams Through Gateway In Big Volume

Heavier Buying of Smokeless and Steam Sizes in Chicago Market Starts Encouraging Movement — Tonnage Is Mostly on Spot Basis

Heavier buying of industrial coals and an improved call for smokeless in the Chicago market has increased the movement through the Cincinnati Gateway. Domestic fuels are in good demand, with the colder weather. As yet, the impending strike has failed to cause much of an increase in steam demands and that market is weaker because of the heavier offerings of fine coals.

Production reflects the improvement in general markets. The non-union sections are in much the better position, with their lower production costs. The general attitude in the trade is to keep the tonnage on the open market for the balance of the coal year. Operators are not quoting on other than current business.

CINCINNATI

Smokeless factors were booked up on orders last week. Instructions to salesmen were necessary to postpone promises of immediate shipment. This came as a result of colder weather and the discovery of a number of retailers that the hand-to-mouth process of buying was insufficient to their needs.

Railways tapping the two smokeless fields reported that there was a free movement of coal from the scales and assembly yard, which also shows that the supply and demand are running neck and neck. Lake buying, usual at this time of year, has not put in an appearance to any great extent.

The domestic situation still controls the bituminous market and Hoover's warning sent in quite a raft of buying orders. Kentuckians raised their prices on both lump and block and were able to get up to $3 without much trouble. As a result, too, their price on nut and slack was lowered and some of the firms were offering choice coals at 75c. West Virginia offerings were more in line with recent prices with no disposition toward concessions on the residue.

The retail situation remains in status quo after the recent drop in prices. Quite a scattering of small orders followed on the heels of the colder weather. The spread in prices has contracted to the cut made ten days ago.

SOUTHEASTERN KENTUCKY

Mines making domestic coal were able to run a little better last week. The average running time for the field, however, is less than three days per week.

There seems to be a better tone in steam, but prices are weak and most orders booked are for small lots.

Differences of opinion exist as to whether there will be a buying movement started in anticipation of a strike. It is known, however, that some big buyers are taking more coal and press reports from Washington calling attention to the seriousness of the situation will no doubt help this movement along.

LOW-VOLATILE FIELDS

New River and the Gulf

New River field conditions are gradually getting better. More mines are able to make lower prices which conform in a measure at least to those currently prevailing. However, there is hardly enough business to afford all mines an opportunity to work. Increased sales of prepared have stimulated production somewhat. More bunker and New England coal is now moving than during December.

Since the first of the year, Winding Gulf mines have been regaining lost ground, with the output now not far from 50 per cent of potential capacity. Increased production may be attributed in part to a somewhat better demand for bunker coal, with a fairly large tonnage also moving to New England.

Pocahontas and Tug River

Although general dullness reigns in the Pocahontas market, mines are managing to work about 50 per cent of rated capacity. There is a little better market for prepared coal and the Tidewater movement is attaining larger volume. Prices are still unaffected by slight fluctuations in demand.

The output in the Tug River field is no larger than during preceding weeks. There is little spot business available unless it is for prepared and even that demand is very light. It is continuously large shipments to steel companies as well as other contract orders which are sustaining production. Tidewater movement is exceedingly light.

HIGH-VOLATILE FIELDS

Kanawha

Although there is a better tone to the market, mines are not sharing in the improvement owing to the impossibility of producing coal at anything like prevailing prices, owing to higher cost of production than in other fields more fortunately situated from a wage standpoint. A few companies have made independent agreements with their employees.

Northeastern Kentucky

Improvement is generally lacking, either as to demand or prices. Dealers have little business to pass on to the producers as their stocks are still heavy. In consequence lump continues to be priced around $2.75@$3. Operators anticipate a better demand for industrial fuels before long.

LOGAN AND THACKER

Although the spot market is unimproved, Logan production continues at a fairly high rate. Most of it is moving on contracts ranging from 30 to 60 days in length, operators as a rule declining to take longer orders than that in view of the uncertainty as to the future.

Conditions remain virtually unchanged in the Thacker district, where the output is not over 35 per cent. There is a light demand for spot, with prepared being sold somewhat more freely. Contract business is about all this field has, with nearly the entire output going to the railroads or to western markets.

NEW ENGLAND

Strike Doesn't Worry New England Greatly

Buyers Begin Purchasing However—Marine Freights Advance—Prices on Water-Borne Coal Firmer—All-Rail Market Quiet

The New England coal market has reacted slightly to the strike talk. Stocks are still heavy but caution is prompting heavier takings. Bad weather slows coastwise movement. Marine freights have advanced as future quotations are being sought for the first time in many months.

Quotations on water-borne coals have firmed up. There is a tendency on the part of idle producers to hold out for a basis of $2 f.o.b. mines before reopening their operations. The all-rail market is still quiet and little coal is moving, aside from contract orders.

BOSTON

Newspaper discussion of possible labor troubles have caused a renewed interest in buying, especially on the part of larger mills. There have been enough inquiries to give the impression that a considerable tonnage will be purchased between now and March 15, and the trade looks to see a more healthy condition from a sales and operating standpoint. Stocks are large in almost every direction, but fuel cost is a relatively small item in manufacturing now and conservative buyers are inclined to err on the side of prudence. Without much doubt another week will see several mill orders in the market.

The slight reaction on coal has come at a time when bottoms on the coast had been held up more or less by adverse weather and in consequence most of the boats in regular service were chartered for their next trip. There is no shortage of tonnage; it is simply that shippers in their desire to name delivered prices for February have besought vessel owners to name rates and higher quotations are the outcome. Several barge owners have advanced their ideas of freight from 85c. to $1.10 on large boats, 3,500 tons upward, and there are rumors of $1.25 having been paid to a Boston point on a sailing vessel of 2,400 tons.

The same condition is reflected at Hampton Roads. Prices f.o.b. vessel on Navy acceptable grades are still ranging $4.65@$4.80, but more than likely the minimum next week will be nearer $4.75. Several groups of mines are either closed down for the time being, or they are operating but a day or two a week, and should the output be materially increased it would doubtless be on a basis a little over $2 per gross ton at the mine, rather than less. This would mean $4.80 as a minimum figure.

Prices on cars at Boston and Portland are firmer also because of better inquiry. From $6.05 several factors have advanced quotations to $6.25, and even $6.35 for small lots. Large buyers are still able to cover at less than $6, but the cheaper coal is being absorbed and the high marine freights will have their effect on delivered prices.

In the Pennsylvania grades there appears no change of any consequence. Output is light; there is no appreciable demand over the Philadelphia and New York piers, and all-rail inquiry is only scattering and very much restricted. The railroads are taking coal only sparingly on last year's contracts, but they are also indulging in a little buying on the spot market.

KANSAS CITY

There has been a material increase in demand, particularly for domestic grades. For the first time in two months domestic orders were more than ample to provide enough steam grades to supply requirements. Steam plants are being solicited and urged to store coal in anticipation of trouble April 1, but are reluctant to pile up much coal.

Retail dealers in Kansas City are overstocked and orders going to the mines are largely from country dealers who fortunately for themselves are not equipped to store much coal.

There are some changes in prices and quotations are as follows: Kansas lump, $5; mine run, $4; nut, $4.50; slack, $2.50; north Missouri lump, $4.75; mine run, $3.50; washed slack, $3.25; raw slack, $2.50; Arkansas lump, $6; mine run, $4; slack, $2.50@$3; McAlester lump, $8.50; nut, $7; slack, $2.50@$2.75; central Illinois lump, $2.50@$3; egg, $2.25@$2.75; slack, $1.75@$2. Franklin County Illinois coal is unchanged and demand is light.

DENVER

Cold weather stimulated production in the last half of January. The output for the third week was about 200,000 tons against 260,000 for the corresponding week last year. The cold weather also reduced the stocks of coal in local yards, which totaled 75,000 tons the first of the year.

No disturbances were reported when the reduction in wages, known as the C. F. & I. scale was put into effect in the bituminous mines of Routt County. The Colorado Rangers had been sent into the camps to keep order.

The Colorado Industrial Commission announced that it had terminated jurisdiction in the following coal mining cases: Royal mine, owned by the National Fuel Co., at Aguilar; Forbes, Piedmont and La Belle mines, owned by the Rocky Mountain Fuel Co., and the Aguilar mine of the Empire Coal Co. Bituminous lump has dropped $1 a ton at the mines.

SALT LAKE CITY

As a result of the severe weather dealers are enjoying the best business for a long time. Some of them are working overtime. Despite this the operators are far from happy. The Coast Trade has not picked up and production in the state is only about 50 per cent of capacity of the mines. The car and labor situation is satisfactory and there is no talk of a change in prices.

Coke

CONNELLSVILLE

The condition of the coke market certainly is no better, nor has it grown any worse. Steel demand has not improved as much as was expected. Pig iron prices are still easier.

There is no real market in furnace coke, as there is no contracting and the spot market is made by sales of small lots to miscellaneous consumers.

Foundry coke continues in light demand and buyers are more critical as to prices. The market is quotable at $2.75@$3 for spot furnace, $3.10@$3.20 for contract furnace, and $3.75@$4.25 for spot foundry.

The *Courier* reports production in the week ended Jan. 21 at 55,830 tons by the furnace ovens, a decrease of 270 tons and 30,720 tons by the merchant ovens, a decrease of 2,090 tons.

UNIONTOWN

Continued developments in the wage situation with the possibility of a strike growing more pronounced each day have created a stir in the unorganized Connellsville field and operators are evidencing an increasing reluctance to contract coal tonnage for any considerable period

Appreciating that any suspension of production in the union fields will send consumers toward the unorganized districts for tonnage operators are not inclined to view favorably future contracts at this time upon the basis of the present market. Spot tonnage is quoted at firm prices and coal standing on track can be bought on that basis, but where a consumer has an eye on the future, considerable difficulty is encountered in securing quotations.

Already there is somewhat of a flurry around the coal offices but the situation has not yet produced any substantial change in the market. Close observers, however, are proceeding upon the belief that a break is not far distant and are preparing to accommodate coal consumers sent scurrying here in a scramble.

Chicago and Midwest

Colder Weather Brings Rush of Coal Orders

Jam of "No-Bills" In Illinois Melts Quickly and Fuel In Transit Sells at Premium—Non-Union Product Comes In Reassuring Quantity.

Midwestern markets have experienced a rush of orders following colder weather. The heavy accumulation of domestic "no-bills" in the Illinois fields were quickly cleared up and coal in transit has even been going at a premium. Eastern non-union coals are being shipped heavily and this reassures consumers, despite the gathering strike clouds.

MIDWEST REVIEW

Cold weather has had its effect far more on the retailer than on the buyer of steam coal. The retail dealers have been buying only for immediate needs for the past six months, and the householders have been doing the same thing, consequently, when the cold snap came, there was an immediate cry for domestic coal. The railroads answered the call for hurry up shipments, and did remarkable service. We heard of two cars shipped from southeastern Kentucky on Jan. 20, which arrived in Chicago and were delivered on Jan. 24.

The Midwest is still undergoing an invasion from Eastern non-union coals. There are instances where West Virginia or Kentucky coal is offered for sale in central Illinois mining towns at prices almost competitive with the local coals. Every week sees an increase in this tonnage produced by the non-union fields of the East.

The steam market weakened considerably during the last few days, as the demand for prepared sizes necessarily entailed a heavy production of screenings and fine coal sizes. No buying, to speak of, has as yet taken place in anticipation of the strike. More out of curiosity than anything else, the writer called on the purchasing agent of a nationally known corporation, dealing in one of the necessities of life, and asked him bluntly why he was not protecting himself and buying coal for the strike, especially as it was necessary for his plant to operate continually, strike or no strike. His answer to this question was that the non-union mines of the country can give American industry all the coal they want, in fact more than they want, even taking into consideration the remote probability of a marked industrial revival.

The ordinary everyday citizen feels that the coal miners have had things their own way quite long enough and that the time has come when union labor ought to be taught that some consideration is due others besides themselves. In short, a coal strike, if it ever materializes, will be unpopular, and no strike in this day and generation can be carried through to a successful culmination without public sympathy. Union labor overshot the mark during the war, and the inevitable reaction has set in.

From the standpoint of the public, the time is favorable for a show-down, as the demand is so slight, a strike would hardly make itself felt. For the first time on record, it is thought, should a coal strike develop this spring, public sympathy will be with the operators, and that means that the operators will win.

CHICAGO

Cold weather stimulated the trade to a marked degree during the past week, putting the whole Chicago trade—wholesale and retail—in a better frame of mind.

The demand for prepared or domestic coals this week increased. Firms with coal in transit sold at prices 25c@50c. a ton better than they had hoped. Demurrage coal was all cleaned up in short order, and wires sent to the mines for rush shipments.

The steam coal market did not come in for a favorable reaction on account of the weather, although more steam coal was purchased last week than during any week since the first of the year. So much screenings were produced, on account of the demand for domestic coals, that if any change took place at all in the market there was a slight softening in prices.

There is some speculation as to whether operators can deliver the vast reserves of coal stored at the mines and elsewhere by some of the larger southern Illinois producing companies in case of a strike. Many men believe strikers could seriously hamper the delivery—and would.

The demand for smokeless coals, in both mine run and prepared sizes, has been good the last few days. The market on West Virginia splints and eastern Kentucky coals did not improve much, so far as Chicago deliveries were concerned, although there was a big demand for these coals among Chicago wholesalers, who were buying for their Western trade.

SOUTHERN ILLINOIS

Cold weather the last week has helped wonderfully in southern Illinois. Demand has become so good that many mines have cleaned out their surplus holdings. This has helped to steady conditions, which were about on the verge of breaking. The movement is not in any one direction, although the Northwest is claiming a better percentage than any other particular section.

Steam shows the result of the strike talk already, for screenings are in good demand and the price is holding its own at about $1.50. Association operators are asking $4.05 for lump, egg and nut, with nut really going at $3.50. Independents are getting from $3.25 on egg and lump up to $3.50 and as low as $2.75 on nut.

Mine run is quoted around $2.75. Railroad tonnage has shown a material increase.

Somewhat similar conditions prevail in the Duquoin and Jackson County fields. Mt. Olive conditions were very unfavorable, when the cold wave hit and the field has come back unusually well on account of the heavy domestic demand. Railroad tonnage out of this field is good.

Standard shows some improvement in the matter of lump, while screenings are heavy and hard to move. Improved working time is indicated this week at many mines. Railroad tonnage is unusually good.

ST. LOUIS

Last week's cold snap stirred up things at the right time. Householders were low on fuel and many good orders are coming in. Dealers note, however, that the great bulk of the demand is for cheaper coal, either Standard or Mt. Olive, and Carterville comes way behind, with very little anthracite or smokeless, and coke not as heavy as was expected.

Steam plants are gradually putting a little ahead, although not in such a way as to cause any flurry in market prices.

The Northwest is buying considerable domestic coal this week and Chicago has bought heavily from the St. Louis market in both steam and domestic on the cheaper grades.

The buyers are beginning to anticipate the suspension expected in April and are buying slowly and cautiously. Evidently they are not going to wait until the last moment.

LOUISVILLE

Cold weather and the fact that consumers bins are running out, is resulting in considerably better retail demand. Jobbers and producers report better business. As a result of increased movement of prepared, supplies of screenings are larger, but not burdensome as industrial demand is improving.

Some industrial concerns are a little worried over the possibility of a miners strike, and are inquiring for prices, and stocking a little fuel. Operators are anticipating a strike, and are not willing to take any contract business. Reports from some sections of the state are to the effect that more coal trains are being put on. Some of the retailers were threatening to cut prices still lower, but the cold spell is reducing surplus stocks, and no further reductions are in prospect at this time, as present prices leave very little margin. Lump is selling $5.50@$7, according to quality.

WESTERN KENTUCKY

As a result of the present cold wave operators are shipping more coal. With the better demand for prepared, the shortage of screenings is being overcome. While prices of fine screenings are weaker the demand is better, as industries are buying and stocking some coal.

Mines are still operating around two days a week. The general outlook is improving, except for the threatened strike, which is resulting in a lack of interest in long time business.

EASTERN INLAND

Wary Buyers Asking For 60-Day Quotations

Strike Talk Stirs Them to Action—But Market Is Too Unsettled for Contract Selling—Low Reserves Raise Demand Somewhat

New wage scales, proposed by southern Ohio and Pittsburgh operators and their unfavorable reception by miners officials, create further likelihood of a tie-up. Abolition of the check-off is contained in each of the proposed agreements. Production, in the meantime, is slowly moving upward.

Buying interest is keener with the strike talk. Detroit buyers see no cause for anxiety, being well supplied with non-union coals. Retail business has picked up, but domestic prices have increased at the expense of the fine coals.

CLEVELAND

A coal strike on April 1 has been accepted as a certainty in this district and operators and consumers are beginning to adjust their plans in accordance. Inquiries are not heavy as yet, but the ice has been broken and there is every indication that buying will increase. Most operators are declining to quote on deliveries over the next month or two. Prices have not stiffened in the slightest degree yet.

In considering the probable demand in case of a shutdown of mines, operators are scanning the general industrial horizon. Improvement in iron and steel has not been as rapid as some observers had believed likely, but gains are being made and impetus to the improvement is expected to grow as spring approaches. Railroads are in a position where they must buy, and since they use about 20 per cent of iron and steel output, favorable developments are looked for from this source.

Some industries are holding off stocking against a strike in the hope of a lower freight rate. There is no attempt on the part of sellers, however, to scare consumers into placing orders now. The feeling prevails that buyers will need no other pressure than urgent necessities when the time comes.

Slack is selling weaker as the recent coal snap stimulated production of prepared domestic sizes. Retailers are selling more coal. Hand-to-mouth buying is a religion in the trade, and deliveries are expected within twenty-four hours after orders are placed.

Receipts of bituminous coal during the week ended Jan. 21 were 1,333 cars, divided: industrial, 859, retail 474. As compared with receipts during the previous week this indicates a decrease of 228 cars for industries, but an increase of 104 cars to retail yards. Receipts have improved greatly since Jan. 1.

COLUMBUS

Retail stocks have been depleted as a result of better household demand and a considerable buying movement is reported from all sections. Prices have stiffened to a small extent.

Retail prices are fairly steady at former levels and no tendency to advance has been noted. Hocking lump sells around $5.75@$6.25, West Virginia splints, $6.75@$7.25. Pocahontas is $8.50@$9, while anthracite is fairly steady around $14.50. Little coke is being sold at present.

Some factories are resuming. Reserve stocks are still large in many instances and this prevents a more active steam demand. Utilities are now the big feature in the buying side of the trade and a steady demand from that source is reported. There is no tendency to buy for the future at this time.

DETROIT

Near zero temperatures have given a slight impetus to demand for domestic but not for steam coal. Wholesalers and jobbers find it difficult to place even high grade steam stock from districts whose product was formerly sought eagerly.

The larger part of the bituminous supply now coming to Detroit is credited to the mines in the unorganized districts. The steam coal buyers are not stocking against a strike.

Three-inch lump from Ohio is quoted at $3, egg at $2.25; mine run, $1.90; nut and slack, $1.60. Four-inch West Virginia lump is quoted $2.60@$2.75; two-inch lump, $2.25; egg $2, mine run $1.65, nut and slack, $1.25; Pittsburgh No. 8 inch-and-a-quarter lump, $2.35; three-quarter lump, $2.25; mine run, $2; nut and slack, $1.65. Smokeless lump and egg is offered $3@$3.25; mine run, $2.15; nut and slack, $1.25.

EASTERN OHIO

Secretary Hoover's warning signals of an approaching strike has apparently not as yet had any effect on demand for coal. Production during the week ended Jan. 21 was 326,000 tons ar approximately 50 per cent of potential capacity. This is a negligible decrease of a few hundred tons under the production of the preceding week.

Railroad officials say that some improvement is noticeable in the volume of freight traffic. This is a hopeful sign that the requirements for railroad fuel will be increasing in the very near future. At the present low rate of mining operations, it is estimated that the carriers are taking between 40 and 45 per cent of eastern Ohio's output.

Inquiries from industrial concerns are more numerous and a better tone prevails. Continued severe weather throughout this section has stimulated the turn-over of retail coal, resulting in their getting into the market for replenishments.

With the slow but gradual upturn in manufacturing lines, together with the likelihood of labor difficulties at the mines, the opinion seems to be that demand will soon increase.

NORTHERN PANHANDLE

Little coal is being produced except for railroad fuel purposes. Commercial plants are still shut down or else working on a very limited basis. The output continues at the rate of about 50,000 tons a week. Prices continue low.

PITTSBURGH

The event of the week in the Pittsburgh district was the announcement by the operators of the wage scale they are prepared to pay when the present scale expires March 31. The new scale is almost identical with the scale of April 16, 1917. The operators will not continue the check-off.

The head of the local district, U. M. W., has replied that the men cannot afford to accept the rates because the percentage of employment is so small.

The market continues quite full. There appears to be no improvement in the general demand for coal, and nearby non-union districts seem to be making closer prices than ever. The market remains quotable approximately as follows: Steam slack, $1.30@$1.50; gas slack, $1.70@$1.80; steam mine run and ordinary gas, $2.10@$2.20; ¾-in., $2.60@$2.70; Panhandle 1¼-in. domestic, $2.75@$2.90.

BUFFALO

The situation does not change much. Some shippers find a trifling improvement in local demand. Consumers not already stocked are hesitant about buying now to protect against a strike shortage. Some of them think there are enough non-union mines at work to keep up the supply.

So far the demand is so light that prices are at the bottom. Shippers are not selling at uniform prices and some of the jobbers find small margins unavoidable. Everybody looks for changes to come out of the April conferences, but nobody is prepared to predict what they will be. Operators coming from the mining districts bring word that the suspension will last from 30 to 90 days. This wide difference of opinion is enough to show that the uncertainty is great and not likely to be less right away.

TORONTO

Cold weather has brought an increased demand for anthracite and dealers are doing an active business. Rumors have been prevalent of a probable drop in price, on account of the lower rate of exchange but dealers say that no change can be expected for some time.

Quotations are as follows:

Retail	
Anthracite egg, stove, nut and grate	$15.50
Pea	14.00
Bituminous steam	10.25@10.75
Domestic lump	12.00
Cannel	16.00
Wholesale, f.o.b. cars at destination	
¾ in. lump	7.00@ 7.75
Slack	6.00@ 6.75

News Items From Field and Trade

COLORADO

Application for authority to reduce wages in its mines has been made by the **Mountain View Coal Co.** at Coal Creek. Four independent coal companies have notified the industrial commission that agreements have been reached with their employees for resumption of work under the new scale.

The Blue Seal Coal Co., in Routt County, has served a 30-day notice on miners that a reduction in wages will be put into effect. There are few mines that have not started to enforce the lower wage scale, and there is a prevailing belief that this reduction will be passed along from the bituminous fields to the lignite mines.

The National Fuel Co., Denver, has contracted for the re-building of the tipple at the Monarch Mine, recently destroyed by fire. The tipple will be complete with a Marcus screen as originally built.

ILLINOIS

The Illinois Central has appointed **W. T. Wright,** of Schellen, as traffic supervisor in southern Illinois. He will have his headquarters at Carbondale.

Ralph Mitchell, superintendent of the Cosgrove Coal Co.'s mines at Marion, is spending a winter vacation at Johnstown, Pa.

C. M. Moderwell of Chicago, who has been connected for some time with the O'Gara interests in Illinois, has severed his connections with that company and will in the future devote his entire time to the company under his own name. This company has recently become enlarged by a merger with the Thos. N. Mordue Co., also of Chicago. The company will continue under the name of C. M. Moderwell & Co., with main offices in Chicago.

Following close on the announcement that Mine 18 of the **By-Products Coal Co.,** at West Frankfort would be closed down indefinitely, the company made a similar announcement concerning Mine 19, also located near West Frankfort. The mine belongs to the Peabody interests.

The Lincoln-Latham Mine, at Lincoln, which is owned and controlled by the **Sangamon County Mining Co.,** of Springfield, and which has again resumed operations after a brief shut-down, has been re-equipped to some extent in underground machinery, including 200 new pit cars.

The working force of the **Springfield District Coal Co.'s** Woodside Mine has been cut from 300 to 100 men by agreement between the company and employes. Conditions were such that steady work for 100 men or irregular work for 300 men was offered, and the miners voted to accept the reduction in working force.

The state has given authority to the **Pratt Coal Co.** to erect a temporary wood tipple at the Jeffrey Mine, Herrin, to replace the one destroyed recently by fire. Record time was made in the replacement and the mine is now in operation. A new steel tipple will be erected soon.

Mine No. 9 of the **Consolidated Coal Co.,** of St. Louis, was recently subjected to a second flood when several million gallons of water broke through when the temporary "fill" in the original cave-in sagged under the weight of tons of earth as the support of flood water receded through the pumping. The second flood was the surface water from an extensive watershed held back from the river by the dams built to keep the river water back from the surface near the cave-in.

INDIANA

The William Nackenhorst Coal Co., of Indianapolis has filed a final certificate of dissolution with the secretary of state.

W. E. Watson, Jr., of the Fairmont & Cleveland Coal Co. and **Glen F. Barnes** of the Hite-Barnes Coal Co. spent the latter part of January at French Lick Springs.

The Lafayette Ice & Coal Co. has been incorporated with capital of $150,000 by H. B. Hanger, L. B. Weisenburgh and W. A. Hanger.

The Binkley Coal Co., an Illinois corporation, has qualified to do business in the state of Indiana. Papers were filed recently showing capital in this state of $150,000. The company will engage in the operation of coal and other properties. M. H. Stark, of Terre Haute, is the Indiana agent.

The Indiana Fourth Vein Mining Co. at Terre Haute, has filed papers showing a capitalization of $100,000, for the purpose of operating coal mines. George G. Rowland, Thomas D. Haskett and Walter S. McCloud are directors of the company.

Officials of the **Little Giant Coal Mine,** in the Linton field, are making plans to install four large motors and much mine machinery as a result of a fire recently which destroyed the engine rooms.

The Clinton Coal Co., of Clinton, has not answered the proposal submitted recently by District No. 11, U. M. W., in an effort to bring about a settlement of the strike of the company's 700 miners. The company told miners that they were willing to meet the men "half way" but would not comply with the request that Richard Bledsoe, over whom the strike was called, be reinstated as well as paid for all time lost since the strike order last October.

KENTUCKY

Himler Coal Co. plans to expend $175,000 in mine development and establishment of a mining town.

The Bell-Dean Coal Co. has been chartered by J. M. O'Brien, Conrad Kolb and Guy Vinson. The same interests are connected with the Vinson-Kolb Coal Co.

J. H. Martin, of the Kanawha-Knox Coal Co., Cincinnati, has been visiting operations in Bell County.

The Grapevine Coal Co., Madisonville, has been chartered with a capital of $300,000 by D. A. Elgin, Benjamin N. Gordon and Robert E. Cooper.

Ray B. Moss, of the Federal Coal Co. has returned from a conference at the office in Chattanooga.

The C. L. Ryley Coal Co., Lexington, has filed amended articles increasing its capital stock from $200,000 to $300,000.

The Cherokee Coal Co., capital $25,000, has been chartered by John F. Hershet, Louis R. Glogower and T. V. Borntraeger.

The Jeffrey Mfg. Co. has filed suit against the bankrupt **Four-in-One Coal Co.** for judgment of $13,309.87 on a note executed by President John A. Selsman of the company last fall to pay for mining machinery shipped to the company mine in Perry County. The Jeffrey company asks a prior lien on the machinery.

Thirty-three miners walked out at the **Canor Creek Coal Co.,** Henderson, recently, when the company refused to reinstate two men discharged a week before. The company had never signed a union contract but had paid the scale. It has announced that hereafter it will operate as a non-union mine.

NEW YORK

Thomas F. Macksey has resigned his position with Dickson & Eddy. Mr. Macksey is well known to the coal trade and was for thirty-two years connected with Dickson & Eddy.

Wentz Company and **Stonega Coke & Coal Co.** announce the removal of their offices from 90 West Street to 25 Broadway, New York.

In accordance with editorial plans for 1922, announced in *Chemical & Metallurgical Engineering,* Jan. 4, the managing editor of that magazine, **J. S. Negru,** will sail for Europe on Feb. 11. He will make a trip through Germany, France, Belgium and other European industrial countries. The purpose of the trip is to study industrial and economic conditions and observe the latest advances in science, engineering and technology. Mr. Negru is unusually well qualified to undertake this work, which should prove distinctly serviceable to the readers and advertisers of *Chemical & Metallurgical Engineering.*

OHIO

A. A. Augustus, president of the Cambridge Collieries Co., Cleveland, has departed for Florida for a brief sojourn.

C. S. Deal, formerly secretary and treasurer of the Sauters Coal Co., Cleveland, large operators in the eastern Ohio field, severed his connection with that firm recently for the purpose of taking a well-earned but long deferred vacation, after thirty years of active participation in the coal trade. Mr. Deal will leave for Los Angeles, and will locate permanently in southern California. **J. D. Sauters** succeeds him.

A. V. Roberts, formerly Detroit representative of the Sauters Coal Co., Cleveland, but more recently with the Fred H. Roberts Co., candy manufacturers, has re-entered the coal business. He is now affiliated with the sales department of the A. F. Baier Coal Co., Cleveland.

Lippincott, Mills & Co., Inc., chartered in New York to deal in coal coke, ores, etc., has recently opened an office in Cleveland, in the Hippodrome Bldg., C. W. Lippincott, who had been the head of Lippincott & Co., coal dealers, is president of the new company.

Charles E. Maurer, of the Glens Run Coal Co., Cleveland, prominent in coal trade circles, has departed for a few weeks' sojourn in Florida.

The common pleas court has named Barton Griffith, Sr., a Columbus attorney, receiver for the Allied Power Industries, a trust estate of Columbus, upon proceedings stated by trustees of the estate in the performance of duties imposed upon them by the creation of the trust. At the same time, Ralph E. Westfall was named receiver for the **Gnaden-Goshen Coal Co.,** a corporation, whose stock is controlled largely by the Allied Power Industries. **The Atomized Fuel Industries Co.,** another corporation, controlled by the trust estate is not affected. The receivership is explained by the dilatoriness in the payment of sums due the trust estate and the trustees are thus unable to meet when due claims of creditors. It is believed that the legal tangle will be straightened out in a few weeks.

State Auditor Tracy, acting as a master commissioner in the case of Thrailkill & Walton against the former Ohio purchasing department, has rendered a decision on pay to be given companies supplying coal to various state institutions under contracts which were declared illegal. **The H. W. Jenkins Coal Co.,** Columbus, has its bill cut $3,720; the **McVicker Coal & Coke Co.,** Cleveland, had its bill cut $1,877, and the **H. S. Odbert Coal Co.,** Cleveland, has its bill cut $2,667. **The Sunday Creek Coal Co.** is to be paid $1.85 per ton instead of $1.95, which was the contract price for 13,000 tons. Small cuts were also handed the **Colonial Coal & Supply Co., The McIntyre Coal Co., The Reliable Coal Co.,** and the **Roberts Coal Co.,** all of Columbus. Payment of the full contract price was recommended in the case of **Castner, Curran & Bullitt,** Cincinnati; **Kinwood Coal Co.,** Columbus, and **F. F. Taggart,** Massillon.

PENNSYLVANIA

Auditor General Lewis is sending out blanks to all anthracite operators for reporting the value of tonnage prepared for market in the period July 1-Dec. 31, 1921, under the provisions of the Williams Act. The auditor general has endeavored to make his list of operators complete, but failure to receive the blanks does not relieve from responsibility for reporting. Operators of washeries and persons or firms recovering anthracite from streams are held by the state authorities to fall within the provisions of the law, and they will be required to fill out returns. Returns are to be made by Feb. 1, but upon application to the auditor general, an extension until Feb. 15, can be obtained.

An involuntary petition in bankruptcy was filed recently against the **Gardner Quemahoning Coal Mining Co.** a corporation engaged in mining and selling coal at Johnstown. Creditors' claims amounted to $598.93.

J. H. Strawn, of Gloversville, N. Y., has been elected secretary and treasurer of the Washington Coal & Coke Co. to succeed the late **J. H. Price.** The stockholders at the annual meeting elected the following directors: Mrs. Sarah B. Cochran, M. M. Cochran, A. C. Sherrard, John M. Core, W. J. Sherrard, A. J. Wurtz, Henry T. Cochran, M. E. Strawn and Charles A. Painter. Officers named were M. M. Cochran, president; M. E. Strawn, vice-president and J. H. Strawn, secretary and treasurer.

Through an application made by **Michael E. Stroup**, a Harrisburg lawyer, for a lease, the members of the Pennsylvania Forest Commission have learned that the state owns anthracite deposits. The coal has been found in an outcrop in the Haldeman state forest, in the Lykens Valley, and Mr. Stroup asks for a 15-year lease, with an option of a 10-year extension.

A mortgage for $60,000,000—the greatest ever executed in Lackawanna County—has been filed. The mortgage is entered into by the **Glen Alden Coal Co.** and the **D. L. & W. Ry.** for the transfer of coal lands in Lackawanna and Luzerne counties from the latter to the former. The mortgage was executed Sept, 21, 1921, and will be reduced by several bond issues. At the time of the segregation of the coal from the railroad interests of the D. L. & W. the Glen Alden company was formed and all of the property of the railroad company, which was connected with the coal department was purchased.

The Somerset & Cambria Coal Mining Co. has closed a deal for the purchase of 110 acres of coal land in Somerset County. The property is located one mile north of Somerset. The company also has obtained an option on an adjoining tract of 500 acres. The company was organized recently, with a capitalization of $100,000. R. H. Speicher is the president of the organization.

Dauphin County assessment figures for taxation purposes have been increased nearly $3,000,000, but the assessors made no changes this year, the time for the triennial assessment, in the valuations placed upon the coal properties of the **Philadelphia & Reading Coal & Iron Co.** and the **Susquehanna Collieries Co.** The holdings of these companies were materially increased three years ago and the increased taxes have not been paid in full, pending court action.

During the first six years of workmen's compensation in Pennsylvania agreements or awards were made in 386,288 cases out of a total of 1,136,060 accidents reported to the **Bureau of Workmen's Compensation** of the State Department of Labor and Industry. The sum of $59,039,651 has been awarded and of this total $32,183,790 has been paid, leaving an outstanding liability at the first of this year of $26,689,022. At the beginning of 1921 there were obligations of $23,544,098 outstanding. During the six-year period there were reported to the bureau 16,166 fatal accidents, 418,193 serious accidents, 709,701 minor accidents.

The customary handsomely engraved calendar of **Weston, Dodson & Co., Inc.**, has been issued to the trade, and accompanying it is a letter of greeting, informing coal consumers of the outlook for the year.

The Weaver-Coleman mining interests, located in Cambria County, and also the interests of the same partnership located in West Virginia, are being divided between the members, B. Dawson Coleman and J. H. Weaver. A report of the dissolution of the partnership was printed in *Coal Age*, Jan. 26, 1922, p. 181. The amount involved in the deal will reach $25,000,000 and includes the Nant-y-Glo Coal Mining Co., the Ebensburg Coal Mining Co., the Monroe Coal Mining Co., and the newly organized Melba Coal Mining Co. These mines were designed for a maximum output of 15,000 tons per day. It is understood that one partner would take the Colver and Melba interests and the other the Nant-y-Glo and Revloc properties. No announcement was made of the division of the holdings in West Virginia.

TENNESSEE

The Eastman Kodak Co. is to erect a $25,000 coal and cinder-handling plant at Kingsport.

The new $750,000 **Dixie Coal & Lime Co.** has purchased 4,000 acres for development.

The Mobile & Ohio R.R. Co. is to erect a $25,000 coal and cinder-handling layout.

UTAH

The Premier Coal Co. of Ogden has filed articles in Idaho. It has a capital stock of $200,000 in 2,000 shares.

The State Securities Commission has granted the **National Coal Co.**, of Salt Lake City, permission to sell $50,000 worth of 6 per cent bonds. This company holds 1,323 acres of coal land on Gordon Creek, Carbon County, and about 80 acres of adjoining lands for a settlement and railroad terminal.

The Royal Coal Co. of Salt Lake City has entered the retail field by opening up a large yard in the city. S. F. Bailif, Jr., is president of the company.

According to a decision just arrived at by the **State Board of Equalization**, coal land assessments for 1922 will be determined on a basis of the location of the beds in relation to transportation. Coal beds that are more than twenty miles from a railroad have been assessed at three mills per ton in the past. During the present year this value will attach to lands between 20 and 30 miles of a railroad. For coal land between 30 and 40 miles the assessment will be 1⅞ mills per ton and for over 40 miles only $\frac{7}{10}$ of a mill will be charged.

According to figures received from the United States Bureau of Mines, the number of men killed in coal mines in this state during 1921 was 15 compared with 37 the year before.

VIRGINIA

Lee Long, superintendent of the Clinchfield Coal Corporation and himself a large mine owner in southwest Virginia, was a recent visitor in Norfolk.

W. E. Hudgins, Jr., formerly head of the Hudgins Fuel Co., is now with Nottingham & Wrenn, coal dealers of Norfolk.

S. T. Snead, commissioner of the Sewall's Point Coal Exchange, has returned from New York, where he attended a meeting of the exchange. **W. S. Saunders**, of Norfolk, general freight agent of the Virginian, also attended this meeting.

Thomas S. Southgate, head of the Southgate Export Coal Co., has been elected chairman of the Woodrow Wilson Foundation committee for Norfolk.

WASHINGTON, D. C.

Four mines are now producing coal from leased government lands under the Leasing Act of Feb. 25, 1920, according to the semi-annual report just submitted to Director H. Foster Bain of the Bureau of Mines by H. I. Smith, acting mining supervisor. Two of these mines are located in Wyoming and one each in Utah and Colorado. According to this report, thirty-one prospecting permits for coal have been granted in Wyoming, nineteen in Montana, eighteen in Colorado, ten in Oregon and smaller numbers in California, Idaho, Nevada, New Mexico, North and South Dakota, Utah and Washington. A total of 104 coal prospecting permits have been granted, in addition to which there have been granted nine leases and five licenses to individuals and associations of individuals.

Representative London, of New York, has introduced a resolution in the House for an investigation by the **House Committee on Mines and Mining**, or a subcommittee, of conditions prevailing in the coal mining industry with particular reference to the condition of the workers and the state of unemployment therein, and to recommend legislation.

The Supreme Court has heard arguments in the case of the **Morrisdale Coal Co. vs.** the United States, on appeal from the Court of Claims, in which the company seeks to recover prices above those fixed by the Fuel Administration during the war.

During consideration of **appropriations for the Shipping Board** in a House debate, Representative Wood, of Indiana, criticised the board for establishing fuel oil stations at fabulous cost and transporting oil thereto, on the far coast of Africa, where he said "coal mines exist everywhere and where free coal is protruding from the ground." He charged that the board was unacquainted with the situation to so establish oil stations and that it had even disregarded advice that oil could not be used in that territory and that coal would be used. "And yet they built oil tanks to supply coal-burning steamers," he said.

Argument was heard recently in the Supreme Court in the suit of the **Pine Hill Coal Co.** for recovery from the government of prices for coal in excess of those fixed by the Fuel Administration. Attorneys for the coal company argued that the prices did not cover cost of production and a fair profit, which they insisted were guaranteed by the Lever Law. Assistant Attorney General Riter for the government argued that the law did not impose a liability on the government to guarantee prices above those fixed by the Fuel Administration.

The Interior Department in a report to Congress states that on Nov. 30 last there were 39,640,172 acres of coal lands in the public domain withdrawn from entry.

R. K. Boggs, of Newport, Ky., Chairman of the Fuel Committee of the National Association of Purchasing Agents, and **H. R. Heydon**, secretary of the association, represented that organization before the Interstate Commerce Commission at the general rate inquiry held in Washington.

WEST VIRGINIA

Paw Paw District of Marion County is to be the seat of operations of the **Fairmane Coal Co.**, the office of which will be at Fairmont. This company is capitalized at $30,000. It was organized by D. A. Maurer, May U. Maurer, P. A. Sacci, T. M. Sacci, T. M. Scott and Martha M. Scott, all of Fairmont.

The American Coal Co. of McComas has contracted for the complete installation of a Marcus tipple at the Crane Creek operation.

A. Lisle White, of Clarksburg, head of the Northern West Virginia Operators' Association, was recently in Washington in attendance at a meeting of the West Virginia Coal Association.

C. H. Jenkins, of Fairmont, treasurer of the Hutchinson Coal Co. and also a director of the National Coal Association was attending a meeting of the West Virginia Coal Association at Washington recently.

Organization of the **Turner Coal Co.** with a capitalization of $150,000 presages further development of the Williamson coal field, this company to operate in the vicinity of Burch. Active in effecting a preliminary organization were: W. R. Turner, of Hamilton, Ohio, J. W. Fuller, E. P. Rice, W. T. Smythe and H. T. Redd of Fairmont.

J. G. Bradley, of Dundon, president of the National Coal Association, attended a meeting of the West Virginia Coal Association at Washington recently, going from Washington to White Sulphur Springs where he attended a meeting of the Winding Gulf Operators' Association.

A reduction in wages and salaries has been made in the Jones interests mines of Logan County, *Coal Age* is informed in a letter from John H. Morris of Lundale. The mines affected are those of the **Lundale Coal Co. the Three-Forks Coal Co. and Toney Coal Co.**, all near Lundale.

W. Gaston Caperton of Slab Fork was at White Sulphur Springs recently attending the annual meeting of the Winding Gulf Operators' Association, of which he is vice president.

C. H. Mead of the Winding Gulf field, with headquarters at Slab Fork, was in attendance at the annual meeting of the Winding Gulf Operators' Association.

A gift which geologists estimated may produce a revenue exceeding $3,000,000 was made to the West Virginia University and the City of Morgantown by **Dr. I. C. White**, State Geologist. It consists of 1,900 acres of coal land in Marion County. The revenue is to be divided equally between the university and the city.

BRITISH COLUMBIA

OUTPUT FOR DECEMBER, 1921

Vancouver Island District

	Tons
Canadian Western Fuel Co., Nanaimo	49,913
Canadian Collieries (D) Ltd.	
Comox	31,500
South Wellington	7,757
Extension	20,326
Nanoose Wellington Collieries	7,400
Granby Consolidated M. S. & P. Co.	24,808
Old Wellington (King & Foster)	485
Total	142,189

Nicola-Princeton District

Middlesboro Collieries	7,186
Fleming Coal Co., Merritt	3,171
Coalmont Collieries, Coalmont	8,488
Princeton Collieries, Princeton	2,415
Total	21,260

Crow's Nest Pass District

Crow's Nest Pass Coal Co. Michel	19,882
Coal Creek	26,939
Corbin Coal & Coke Co.	4,398
Total	51,219
Total for December	214,668
Total for November	234,800

Traffic News

The commission has authorized the establishment of rates on coal from Springfield, Ill., and points in the Springfield group and related groups, to Hannibal, Mo., via Bowling Green, Mo., the same as rates by the direct line and to continue higher rates at intermediate points.

Upon further consideration the commission has decided that the differentials established in the Illinois coal cases are reasonable. These differentials are from the Third Vein, Springfield and Belleville districts and are 70c., 30c. and 10c. below rates from the southern Illinois group and 40c. and 70c. less than rates from the Fulton-Peoria district.

The commission has authorized the Alaska Anthracite R.R. to construct an extension of its line in Alaska.

The application of the C. M. & St. P. Ry. to build a belt-line between Aurora and Joliet, Ills., is regarded in the Twin Cities as promising a more direct line for hauling coal from the Indiana fields to the Northwest, avoiding the Chicago terminals.

An examiner of the I. C. C. has recommended that the combination rate on a car of soft coal from Alger, Wyo., to Montevideo, Minn., during Federal control was not unreasonable, as complained by **F. L. Starbeck.**

In the matter of intrastate rates on bituminous coal in Ohio, the **Toledo Chamber of Commerce** has filed a brief with the I. C. C. contending that the rates on coal between points in Ohio are unreasonably high in themselves and in comparison with rates from other mines to Toledo and from Ohio mines to destinations in C. F. A. territory.

In the complaint of **Michael S. Goss** and others and **Albert H. Traphagen** and others, an I. C. C. examiner recommends that the rates on coal from the anthracite region in Pennsylvania to Auburn, Groton, Moravia, Waterloo and Seneca Falls, N. Y., via the Lehigh Valley R. R., is unreasonable.

In the complaint of the **Hewitt-Wilcox Coal Co.**, an examiner recommends that the joint rates of the D., L. & W. and the N. Y. C. on anthracite from Pennsylvania mines to Auburn, N. Y., are not unreasonable.

The Chicago & Eastern Illinois system's coal road, known as the **Brazil Branch**, has been sold, the bondholders buying the line, on which they hold $5,550,000 in obligations, for $15,000. Edwin P. Kelly, attorney, of Chicago, made the purchase for the bondholders. Operation of the road was abandoned by the C. & E. I. the first of the year.

Governor Davis has ordered the Ohio Public Utlities Commission to start at once a thorough investigation of freight rates on coal shipments within the state with a view of reducing them. The governor transmitted to the commission a mass of data, showing that increased freights during the period of government control of railroads amounted to from 104 to 250 per cent. This is one of the big discouragements to the coal industry in the state and the governor desires it to be remedied as soon as possible.

The National Retail Coal Merchants Association, of Philadelphia in a complaint to the I. C. C. alleges unjust, unreasonable, discriminatory, preferential and otherwise unlawful and illegal rates, charges, rules, regulations and practices relating to weighing and re-weighing of hard and soft coal and coke.

Recent Patents

Coal-Mine Curtain Rod. John M. North, Sparta, Ill., 1,398,909. Nov. 29, 1921. Filed Oct. 10, 1918; serial No. 257,626.

Lamp Holder for Miners' Caps. Joseph Barta, Martins Ferry, Ohio, 1,397,200. Nov. 15, 1921. Filed Jan. 18, 1921; serial No. 438,216.

Apparatus for Purifying Water. Andrew J. Reed, Wilkes-Barre, Penn., 1,397,452. Nov. 15, 1921. Filed June 28, 1921; serial No. 481,024.

Mining Self-Loading and Unloading Scraper. Charles H. Strange, Minersville, Penn., 1,397,560. Nov. 22, 1921. Filed June 29, 1920; serial No. 392,862.

Mining Machine. Nils D. Levin, Columbus, Ohio, assignor to The Jeffrey Mfg. Co., Columbus, Ohio, 1,395,647. Nov. 1, 1921. Filed Sept. 28, 1916; serial No. 122,705. Renewed Jan. 28, 1921; serial No. 440,806.

Mineral or Coal-Separating Jig. Harry D. Kostenbauder, Aristes, Penn., 1,395,716. Nov. 1, 1922. Filed Oct. 2, 1920; serial No. 414,168.

Conductor for Mine Explosives. Robert L. Bowman. Knoxville, Tenn., 1,395,791. Nov. 1, 1921. Filed Jan. 19, 1921; serial No. 438,416.

Conductor for Mine Explosives. Robert L. Bowman, Knoxville, Tenn., 1,395,792. Nov. 1, 1921. Filed Jan. 19, 1921; serial No. 438,417.

Ventilating Signal Appliance for Mines. James F. Gamille, Fredericktown, Penn., 1,395,594. Nov. 1, 1921. Filed July 19, 1919; serial No. 312,009.

Mining Machine. Morris B. Holmes, Claremont, N. H., assignor to the Sullivan Machinery Co., Chicago, Ill., 1,395,996. Nov. 1, 1921. Filed May 23, 1918; serial No. 236,225. Renewed March 30, 1921; serial No. 457,028.

Rock Crusher. James F. Betchkaw, Berlin, Wis., assignor to The Frog Switch & Mfg. Co., Carlisle, Pa., 1,396,016. Nov. 8, 1921. Filed May 22, serial No. 298,880.

Apparatus for Utilizing Lump Fuel. Joseph H. Cooper, Chicago, Ill., 1,396,097. Nov. 8, 1922. Filed July 20, 1918; serial No. 245,803.

Power Shovel or Excavating Machine. Charles Lotte, Marion, Ohio, 1,396,375. Nov. 8, 1921. Filed Jan. 30, 1920; serial No. 355,089.

Publications Received

Magnitude of the Power Plant's Chimney Loss—Uehling Instrument Co., Paterson, N. J. Bulletin No. 220. Pp. 7; 6 x 9¼ in. Charts and tables.

Relation Between CO_2 and Money Wasted Up the Chimney—Uehling Instrument Co., Paterson, N. J. Bulletin No. 221. Pp. 11; 6 x 9¼ in. Charts and tables.

Outspinning the Spider—Robert L. Stillson Co., New York City. Pp. 137; 6 x 8½ in. This book, written by John Kimberly Memford, gives the history of wire-rope making in this country from the beginning of the industry in 1840 by John A. Roebling Sons Co., together with other interesting facts concerning the industry.

Miners' Safety and Health Almanac—Department of the Interior, Bureau of Mines. Pp. 51; 6 x 9 in.; illustrated. Published in co-operation with the United States Public Health Service for the use of miners.

Trade Catalogs

Diamond Core Drills—E. J. Longyear Co., Minneapolis, Minn. Bulletin No. 16. Pp. 18; 6 x 9 in.; illustrated. Description of diamond core drills manufactured by this company.

Jeffrey Coal and Ashes Handling Machinery for Boiler Houses—The Jeffrey Mfg. Co., Columbus, Ohio. Catalog No. 345. Pp. 19; 7½ x 10½ in.; illustrated. Describes twelve distinctive types of power-house equipment.—Advertiser.

Jeffrey Portable Car Unloader—The Jeffrey Mfg. Co., Columbus, Ohio. Bulletin 360. Pp. 8; 7½ x 10½ in.; illustrated. For unloading coal from hopper-bottom railroad cars.—Advertiser.

"Durable" Duplex Pumps—Dean Bros. Steam Pump Works, Indianapolis, Ind. Catalog No. 107. Pp. 68; 6 x 9 in.; illustrated. Describes its various pumps, with tables and directions for setting up and running pumps.

Calite Castings—Calorizing Company of Pittsburgh, Pittsburgh, Pa. Bulletin No. CT-1. Pp. 4; 8½ x 11 in.; illustrated. Describes the use of these castings in high temperatures.

High Tension, Unit Type, Outdoor Substation Equipment—Delta-Star Electric Co., Chicago, Ill. Bulletin No. 37. Pp. 64; 8 x 10½ in.; illustrated. Describes high-tension outdoor substations.

Aristos "Copperweld" Wire for Series Lighting Circuits—Copper Clad Steel Co., Rankin, Pa. One page giving technical data and tables.

Aristos "Copperweld" Signal Wire—Copper Clad Steel Co., Rankin, Pa. One page giving technical data and tables.

Association Activities

Monongahela Coal Association

George S. Connell, of Connellsville, and A. Q. Davis, of Uniontown, have been elected directors of the Monongahela Coal Association, an organization formed by West Virginia coal operators in the territory south from the Pennsylvania state line to Fairmont. The officers of the association, which will have headquarters in Morgantown are: W. E. Watson, Fairmont, president; B. M. Chaplin, vice-president; J. B. Hanford, treasurer, and Harry C. Owen, acting secretary. All of the officers with the exception of Mr. Watson reside in Morgantown.

West Kentucky Coal Bureau

The bureau, which represents members of two of the western Kentucky operators' associations, held its annual meeting in Louisville on Jan. 10, at which time M. B. Lanier, of the Norton Coal Co., Nortonsville, Ky., was elected president to succeed Frank D. Rash, of the St. Bernard Coal Mining Co. Clarence M. Martin, of the Greenville Coal Co., Greenville, Ky., was elected vice-president, succeeding C. W. Taylor, Greenville. C. E. Reed, Louisville, was re-elected secretary-manager.

J. Van Dyke Norman, counsel for the association, made an interesting talk on the work of the bureau during the year, and the progress shown in securing equitable rate adjustments, which had opened up several new selling districts for the members. Following the business sessions there was a dinner at the Seelbach Hotel.

Pittsburgh Coal Producers' Association

O. A. Blackburn was re-elected chairman of the executive committee of the association at the annual meeting held recently in Pittsburgh. The custom of the association is to give each chairman two terms of a year each.

Obituary

Jesse M. Harmon, president and general manager of the Utah Timber & Coal Co., Provo, Utah, died recently at the age of 53. Deceased was one of the most prominent men in Utah County.

Arthur K. Knotts, aged 60, for twenty years engaged in the insurance, real estate and coal business, dropped dead last night in the lobby of the Central Hotel, Uniontown, Pa. He was a native of Greene County but had lived in Uniontown since 1880. He was one of the organizers of the Eureka Coal & Coke Co.

Coming Meetings

American Institute of Electrical Engineers will hold its midwinter convention in New York City, Feb. 15, 16 and 17. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

American Institute of Mining and Metallurgical Engineers will meet on Feb. 20 to 23 in New York City. Secretary, F. F. Sharpless, 29 West 39th St., New York City.

Canadian Institute of Mining and Metallurgy will hold its annual meeting March 1, 2 and 3 at Ottawa, Canada. Secretary, G. C. Mackenzie, Drummond Building, Montreal, Quebec, Canada.

Southern Appalachian Coal Operators' Association will hold its next meeting Feb. 10, 1922, at Knoxville, Tenn. Secretary, J. E. McCoy, Knoxville, Tenn.

Pittsburgh Vein Operators' Association of Ohio will hold its annual meeting on Feb. 13, 1922, at Cleveland, Ohio; D. F. Hurd, secretary.

Rocky Mountain Coal Mining Institute will hold its next meeting at the Albany Hotel, Denver, Col., on Feb. 20, 21 and 22. Secretary-Treasurer, F. W. Whiteside, Denver, Col.